

FEDERAL SIGNAL CORP /DE/
Form 10-K
February 28, 2019
Table of Contents

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018

OR
 TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission File Number 1-6003

FEDERAL SIGNAL CORPORATION

(Exact name of registrant as specified in its charter)

Delaware

(State or other jurisdiction of incorporation or organization) 36-1063330 (I.R.S. Employer Identification No.)

1415 West 22nd Street,

Oak Brook, Illinois

(Address of principal executive offices)

60523

(Zip Code)

Registrant's telephone number, including area code (630) 954-2000

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, par value \$1.00 per share	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past

90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or shorter period that the registrant was required to submit and post such files). Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this

Form 10-K.

Edgar Filing: FEDERAL SIGNAL CORP /DE/ - Form 10-K

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and “emerging growth company” in Rule 12b-2 of the Exchange Act.

Large accelerated filer Accelerated filer
Non-accelerated filer Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes No

As of June 30, 2018, the aggregate market value of voting stock held by non-affiliates was \$1,371,933,852. For purposes of the foregoing calculation only, executive officers and directors of the registrant have been deemed to be affiliates.

As of January 31, 2019, the number of shares outstanding of the registrant’s common stock was 60,148,935.

Documents Incorporated By Reference

Portions of the registrant’s definitive proxy statement for the 2019 Annual Meeting of Stockholders are incorporated by reference in Part III.

Table of Contents

FEDERAL SIGNAL CORPORATION

TABLE OF CONTENTS

PART I

Item 1. <u>Business</u>	Page <u>2</u>
Item 1A. <u>Risk Factors</u>	<u>6</u>
Item 1B. <u>Unresolved Staff Comments</u>	<u>10</u>
Item 2. <u>Properties</u>	<u>10</u>
Item 3. <u>Legal Proceedings</u>	<u>10</u>
Item 4. <u>Mine Safety Disclosures</u>	<u>11</u>

PART II

Item 5. <u>Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities</u>	<u>11</u>
Item 6. <u>Selected Financial Data</u>	<u>13</u>
Item 7. <u>Management's Discussion and Analysis of Financial Condition and Results of Operations</u>	<u>15</u>
Item 7A. <u>Quantitative and Qualitative Disclosures about Market Risk</u>	<u>33</u>
Item 8. <u>Financial Statements and Supplementary Data</u>	<u>34</u>
Item 9. <u>Changes in and Disagreements with Accountants on Accounting and Financial Disclosure</u>	<u>85</u>
Item 9A. <u>Controls and Procedures</u>	<u>85</u>
Item 9B. <u>Other Information</u>	<u>85</u>

PART III

Item 10. <u>Directors, Executive Officers and Corporate Governance</u>	<u>86</u>
Item 11. <u>Executive Compensation</u>	<u>86</u>
Item 12. <u>Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters</u>	<u>86</u>
Item 13. <u>Certain Relationships and Related Transactions and Director Independence</u>	<u>86</u>
Item 14. <u>Principal Accounting Fees and Services</u>	<u>86</u>

PART IV

Item 15. <u>Exhibits, Financial Statement Schedules</u>	<u>87</u>
Item 16. <u>Form 10-K Summary</u>	<u>87</u>
<u>Exhibit Index</u>	<u>89</u>
<u>Signatures</u>	<u>93</u>

Table of Contents

FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K (“Form 10-K”) is being filed by Federal Signal Corporation and its subsidiaries (referred to collectively as the “Company,” “we,” “our” or “us” herein, unless the context otherwise indicates) with the United States (“U.S.”) Securities and Exchange Commission (the “SEC”), and includes comments made by management that may contain words such as “may,” “will,” “believe,” “expect,” “anticipate,” “intend,” “plan,” “project,” “estimate” and “objective” terminology, or the negative thereof, concerning the Company’s future financial performance, business strategy, plans, goals and objectives. These expressions are intended to identify forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the “Securities Act”), Section 21E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”) and the Private Securities Litigation Reform Act of 1995.

Forward-looking statements include information concerning the Company’s possible or assumed future performance or results of operations and are not guarantees. While these statements are based on assumptions and judgments that management has made in light of industry experience as well as perceptions of historical trends, current conditions, expected future developments and other factors believed to be appropriate under the circumstances, they are subject to risks, uncertainties and other factors that may cause the Company’s actual results, performance or achievements to be materially different.

These risks and uncertainties, some of which are beyond the Company’s control, include, but are not limited to, the risk factors described under Item 1A, Risk Factors as set forth in Part I, as well as those discussed elsewhere in this Form 10-K. These factors may not constitute all factors that could cause actual results to differ materially from those discussed in any forward-looking statement. The Company operates in a continually changing business environment and new factors emerge from time to time. The Company cannot predict such factors, nor can it assess the impact, if any, of such factors on its results of operations, financial condition or cash flow. Accordingly, forward-looking statements should not be relied upon as a predictor of actual results. The Company disclaims any responsibility to update any forward-looking statement provided in this Form 10-K.

ADDITIONAL INFORMATION

The Company is subject to the reporting and information requirements of the Exchange Act and, as a result, is obligated to file Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and other reports and information with the SEC, as well as amendments to those reports. The Company makes these filings available free of charge through our website at www.federsignal.com as soon as reasonably practicable after such materials are filed with, or furnished to, the SEC. Information on our website does not constitute part of this Form 10-K. In addition, the SEC maintains a website at www.sec.gov that contains reports, proxy and information statements and other information regarding issuers that file electronically.

Table of Contents

PART I

Item 1. Business.

Federal Signal Corporation, founded in 1901, was reincorporated as a Delaware corporation in 1969. The Company designs, manufactures and supplies a suite of products and integrated solutions for municipal, governmental, industrial and commercial customers. The Company's portfolio of products that it manufactures includes sewer cleaners, vacuum trucks, street sweepers, waterblasters, dump truck bodies, trailers, and safety and security systems, including technology-based products and solutions for the public safety market. In addition, we sell parts and provide service, repair, equipment rentals and training as part of a comprehensive aftermarket offering to our customers. Federal Signal Corporation and its subsidiaries operate 14 principal manufacturing facilities in five countries and provide products and integrated solutions to customers in all regions of the world.

Narrative Description of Business

Products manufactured and supplied, and services rendered, by the Company are divided into two reportable segments: the Environmental Solutions Group and the Safety and Security Systems Group. The individual operating businesses are organized as such because they share certain characteristics, including technology, marketing, distribution and product application, which create long-term synergies. Corporate contains those items that are not included in our reportable segments.

Financial information concerning the Company's two reportable segments for each of the three years in the period ended December 31, 2018, is included in Note 16 – Segment Information to the accompanying consolidated financial statements and is incorporated herein by reference. Information regarding the Company's discontinued operations is included in Note 18 – Discontinued Operations to the accompanying consolidated financial statements and is incorporated herein by reference.

Environmental Solutions Group

Our Environmental Solutions Group is a leading manufacturer and supplier of a full range of street sweeper vehicles, sewer cleaner and vacuum loader trucks, hydro-excavation trucks, high-performance waterblasting equipment, dump truck bodies and trailers. The Group manufactures vehicles and equipment in the U.S. and Canada that are sold under the Elgin®, Vactor®, Guzzler®, Westech™, Jetstream®, Ox Bodies®, Crysteel®, J-Craft®, Duraclass®, Rugby® and Travis® brand names. Products are sold to both municipal and industrial customers either through a dealer network or direct sales to service customers generally depending on the type and geographic location of the customer. The acquisition of substantially all of the assets and operations of Joe Johnson Equipment, Inc. and Joe Johnson Equipment (USA), Inc. (collectively, "JJE") in 2016 extended the Environmental Solutions Group's existing sales channel and increased the number of service centers through which its parts, service and rental offerings can be provided to current and potential customers. The acquisition of JJE also broadened the Environmental Solutions Group's product offerings to include other products, such as refuse and recycling collection vehicles, camera systems, ice resurfacing equipment and snow-removal equipment. In addition to vehicle and equipment sales, the Group also engages in the sale of parts, service and repair, equipment rentals and training as part of a complete offering to its current and potential customers through its service centers located across North America.

Under the Elgin brand name, the Company sells a leading U.S. brand of street sweepers primarily designed for large-scale cleaning of curbed streets, parking lots and other paved surfaces utilizing mechanical sweeping, vacuum and recirculating air technology. Vactor is a leading manufacturer of vacuum trucks used to maintain sewer lines, catch basins and storm sewers, as well as hydro-excavation trucks to meet the need for safe and non-destructive excavation. Guzzler is a leader in industrial vacuum loaders used to manage industrial waste or recover and recycle valuable raw materials. Westech is a manufacturer of high-quality, rugged vacuum trucks. Jetstream manufactures high pressure waterblast equipment and accessories for commercial and industrial cleaning and maintenance operations. The Company manufactures and sells dump truck bodies and trailers under the Ox Bodies, Crysteel, J-Craft, Duraclass, Rugby and Travis brand names.

Safety and Security Systems Group

Our Safety and Security Systems Group is a leading manufacturer and supplier of comprehensive systems and products that law enforcement, fire rescue, emergency medical services, campuses, military facilities and industrial sites use to protect people and property. Offerings include systems for campus and community alerting, emergency vehicles, first responder interoperable communications and industrial communications, as well as municipal networked security. Specific products include vehicle lightbars and sirens, public warning sirens, general alarm systems, public address systems and public safety software. Products are sold under the Federal Signal™, Federal Signal VAMA® and Victor® brand names. The Group operates manufacturing facilities in the U.S., Europe and South Africa.

Table of Contents

Marketing and Distribution

Depending primarily on the type and geographic location of the end-customer, the Environmental Solutions Group uses either a dealer network, including JJE, or direct sales to serve customers. The 2017 acquisition of Truck Bodies and Equipment International (“TBEI”) increased the number of dealers within our network and also added additional direct sales resources. The dealer network serves both municipal and industrial end markets. Within municipal markets, the majority of our dealers operate exclusively in their assigned territory. In conjunction with selling vehicles to end-customers, dealer representatives demonstrate vehicle functionality and capability and provide vehicle service. In addition to selling products manufactured by the Company, JJE distributes and re-sells products manufactured by other companies. The Company believes its regional, national and global dealer networks for vehicles is a distinguishing factor from its competitors. The Environmental Solutions Group’s direct sales channel concentrates on the industrial, utility and construction market segments, and the service centers provide post-sale service, ancillary parts and equipment rentals. The acquisition of JJE increased the number of service centers through which its parts, service and rental offerings can be provided to current and potential customers.

The Safety and Security Systems Group sells to industrial customers through wholesalers and distributors who are supported by Company sales personnel or independent manufacturer representatives. Products are also sold to municipal and governmental customers through active independent distributors, as well as through original equipment manufacturers and the direct sales force. The Company sells comprehensive integrated warning and interoperable communications through a combination of the direct sales force and independent distributors. International sales are made through independent foreign distributors or on a direct basis.

Customers and Backlog

No single customer accounted for 10% or more of the Company’s net sales in any year within the three-year period ended December 31, 2018. Of the \$1,173.2 million total orders reported in 2018, approximately 31% were from U.S. municipal and governmental customers, 47% were from U.S. commercial and industrial customers and 22% were from non-U.S. customers.

During 2018, the Company’s U.S. municipal and governmental orders increased by 3% compared to 2017 levels, primarily due to improved orders for sewer cleaners and public safety products, partially offset by lower orders for outdoor warning systems. During 2017, the Company’s U.S. municipal and governmental orders increased by 18% compared to 2016 levels, driven by improved orders for street sweepers and sewer cleaners, as well as additional orders for dump truck bodies following the acquisition of TBEI.

During 2018, the Company’s U.S. industrial and commercial orders increased by 29% from 2017 levels, largely attributable to improved orders for vacuum trucks, the effects of a full year of TBEI orders in 2018 compared to seven months of activity in 2017, and increased orders for outdoor warning systems within the Safety and Security Systems Group. During 2017, the Company’s U.S. commercial and industrial orders increased by 140% from 2016 levels, largely attributable to improved orders for sewer cleaners and vacuum trucks, the addition of orders following the TBEI acquisition, the effects of a full year of JJE orders in 2017 compared to seven months of activity in 2016, and increased orders from industrial markets within the Safety and Security Systems Group.

During 2018, the Company’s non-U.S. orders increased by 8% from 2017, largely due to a \$7.8 million increase within the Environmental Solutions Group, reflecting increased orders for vacuum trucks, sewer cleaners and street sweepers, as well as the effects of higher aftermarket demand. These increases were partially offset by lower orders for refuse trucks. Within the Safety and Security Systems Group, non-U.S. orders increased by \$11.7 million, driven by improved orders from international public safety markets. During 2017, the Company’s non-U.S. orders increased by 21% from 2016, largely due to a \$35.6 million increase within the Environmental Solutions Group, reflecting increased Canadian orders following the acquisition of JJE in June of 2016. Within the Safety and Security Systems Group, non-U.S. orders increased by \$5.2 million, driven by improved orders in industrial and coal markets, partially offset by reduced orders from international public safety markets.

Of the Company’s non-U.S. orders received in 2018, approximately 62% were from Canada, 19% were from Europe and less than 10% were from any other particular region. Non-U.S. municipal and governmental markets are similar to

the U.S. municipal and governmental markets in that they are largely dependent on tax revenues to support spending and orders may be subject to budgetary cycles and public-entity bid procedures.

The Company's backlog totaled \$337.7 million at December 31, 2018 compared to \$257.5 million at December 31, 2017. The increase of \$80.2 million, or 31%, was attributable to higher demand for vacuum trucks, sewer cleaners and street sweepers. Backlogs vary by group due to the nature of the Company's products and the buying patterns of its customers. TBEI's product lines typically experience average lead times ranging from one to three months. Following the acquisition of TBEI, the Environmental Solutions Group typically experiences an average backlog of approximately three to six months of shipments.

Table of Contents

The Safety and Security Systems Group typically experiences an average backlog of approximately two months of shipments. Production of the Company's December 31, 2018 backlog is expected to be substantially completed during 2019.

Suppliers

The Company purchases a wide variety of raw materials from around the world for use in the manufacture of its products, although the majority of current purchases are from North American sources. To minimize risks relating to availability, price and quality of key products and components, the Company is party to numerous strategic supplier arrangements. Although certain materials are obtained from either a single-source supplier or a limited number of suppliers, the Company has generally identified alternative sources to minimize the interruption of its business in the event of supply disruptions.

Components critical to the production of the Company's vehicles, such as engines, are purchased from a select number of suppliers. The Company also purchases raw and fabricated steel, as well as commercial chassis, from multiple sources. In addition, we may incorporate chassis provided directly by our customers in our production process. As a distributor of equipment manufactured by other companies, JJE relies on the availability of equipment supplied by others to meet customer demand.

While there are risks and uncertainties with respect to the supply of certain raw materials and components that could impact price, quality and availability in sufficient quantities, the Company believes it has adequate supplies and sources of availability of the raw materials and components necessary to meet its needs.

Competition

Within the Environmental Solutions Group, Elgin is recognized as a market leader among domestic sweeper competitors and differentiates itself primarily on product performance. The Vactor and Guzzler brands each maintain a leading domestic position in their respective marketplaces by enhancing product performance with leading technology and application flexibility. Jetstream is a market leader in the in-plant cleaning segment of the U.S. waterblast industry, competing on product performance, rapid delivery and solutions services. JJE is a leading Canadian-based distributor of maintenance equipment for municipal and industrial markets. TBEI includes a portfolio of regional brands with market leadership positions in distinct geographies and product categories, differentiating itself with its broad regional distribution network, focus on customer responsiveness and operational expertise. Within specific product categories and domestic markets, the businesses within the Safety and Security Systems Group are among the market leaders. The Group's international market position varies from leader to ancillary participant depending on the geographic region and product line. Generally, competition is intense within all of the Group's product lines and purchase decisions are made based on price, features, reputation, performance and service, often within competitive bidding situations.

Patents and Trademarks

The Company owns a number of patents and possesses rights under others to which it attaches importance, but it does not believe that its business as a whole is materially dependent upon any such patents or rights. The Company also owns a number of trademarks, including those listed within the "Narrative Description of Business" section above. We believe these trademarks are important in connection with the identification of our products and associated goodwill with customers, but no material part of the Company's business is dependent on our trademarks.

Employees

The Company employed approximately 3,300 people in its businesses at December 31, 2018, with the Company's U.S. hourly workers accounting for approximately 52% of its total workforce. Approximately 17% of the Company's U.S. hourly workers were represented by unions at December 31, 2018. The Company believes that its labor relations with its employees are good.

Governmental Regulation of the Environment

The Company believes it complies with federal, state and local provisions that have been enacted or adopted regulating the discharge of materials into the environment, or otherwise relating to the protection of the environment. The Company endeavors to establish environmentally-friendly policies and objectives, and believes that these actions

are also consistent with cost-effective operating practices. Capital expenditures in 2018 attributable to compliance with such laws were not material. The Company believes that the overall impact of compliance with environmental regulations will not have a material adverse effect on our financial position, results of operations or cash flow. In May 2012, the Company sold a facility in Pearland, Texas. The facility was previously used by the Company's discontinued Pauluhn business, which manufactured marine, offshore and industrial lighting products. As of December 31, 2018 and 2017,

4

Table of Contents

\$0.4 million and \$0.5 million, respectively, of reserves related to the environmental remediation of the Pearland facility have been included in liabilities of discontinued operations on the Consolidated Balance Sheets. The Company's estimate may change as more information becomes available; however, the costs are not expected to have a material adverse effect on the Company's results of operations, financial position or cash flow.

Seasonality

Certain of the Company's businesses are susceptible to the influences of seasonal factors, including buying patterns, delivery patterns and productivity influences from holiday periods and weather. In general, the Company tends to have lower equipment sales in the first calendar quarter of each year compared to other quarters as a result of these factors. In addition, rental income and parts sales are generally higher in the second and third quarters of the year, because many of the Company's products are used for maintenance activities in North America, where usage is typically lower during periods of harsher weather conditions.

Executive Officers of the Registrant

The following is a list of the Company's executive officers, their ages, business experience and positions as of February 1, 2019:

Jennifer L. Sherman, age 54, was appointed President and Chief Executive Officer effective January 1, 2016. Ms. Sherman was also appointed to the Board of Directors effective January 1, 2016. Since joining the Company in 1994, Ms. Sherman has served in various roles of increasing responsibility, most recently as Senior Vice President and Chief Operating Officer from April 2014 to December 31, 2015. Ms. Sherman also previously served as Senior Vice President, Chief Administrative Officer, General Counsel and Secretary from 2010 to April 2014, Senior Vice President, Human Resources, General Counsel and Secretary from 2008 to 2010, and Vice President, General Counsel and Secretary from 2004 to 2008.

Daniel A. DuPré, age 62, was appointed Vice President, General Counsel and Secretary in November 2015. Mr. DuPré joined the Company in 2006, most recently serving as its Deputy General Counsel. Mr. DuPré previously held senior legal positions at Sears Holdings Corporation, Bank One Corporation, and Brunswick Corporation and served as an Assistant United States Attorney for the Northern District of Illinois.

Lauren B. Elting, age 37, was appointed Vice President and Corporate Controller in May 2018. Prior to joining the Company in January 2017, Ms. Elting worked at Ernst & Young LLP from 2004 to 2016, most recently as Senior Audit Manager.

Robert E. Fines, age 60, was appointed Vice President and General Manager of TBEI in June 2017, following the Company's acquisition of TBEI, where Mr. Fines had served as Chief Executive Officer since 2008. Prior to joining TBEI, Mr. Fines held senior management positions at Kirtland Capital, Avery Dennison and GE Plastics.

Ian A. Hudson, age 42, was appointed Senior Vice President and Chief Financial Officer in October 2017. Mr. Hudson joined the Company in August 2013 as Vice President and Corporate Controller. Prior to joining the Company, Mr. Hudson served as Director of Accounting – Latin America and Asia Pacific at Groupon, Inc. from June 2012 to August 2013. Prior to that role, Mr. Hudson worked at Ernst & Young, LLP from 1998 to 2012, most recently as Senior Audit Manager.

Svetlana Vinokur, age 39, was appointed Vice President, Treasurer and Corporate Development in April 2015. Prior to joining the Company, Ms. Vinokur worked as Assistant Treasurer at Illinois Tool Works Inc. Prior to that role, Ms. Vinokur served as Finance Head of M&A Strategy at Mead Johnson Nutrition Company and as a senior associate for Robert W. Baird & Company's Consumer and Industrial Investment Banking group. Ms. Vinokur started her career at Ford Motor Company, serving in various finance roles.

Mark D. Weber, age 61, was appointed Senior Vice President and Chief Operating Officer in January 2018, upon rejoining the Company after four years at Supreme Industries, Inc. ("Supreme"). Mr. Weber joined Supreme in May 2013 as President and Chief Executive Officer, serving in that capacity up to the sale of Supreme to Wabash National Corporation, which was completed in September 2017. Prior to joining Supreme, Mr. Weber worked for 17 years as an executive within the Company's Environmental Solutions Group, including a decade as Group President.

These officers hold office until the next annual meeting of the Board of Directors following their election and until their successors have been elected and qualified.

There are no family relationships among any of the foregoing executive officers.

Table of Contents

Item 1A. Risk Factors.

We may occasionally make forward-looking statements and estimates such as forecasts and projections of our future performance or statements of our plans and objectives. These forward-looking statements may be contained in, but are not limited to, filings with the SEC, including this Form 10-K, press releases made by us and oral statements made by our officers. Actual results could differ materially from those contained in such forward-looking statements. Important factors that could cause our actual results to differ from those contained in such forward-looking statements include, but are not limited to, the risks described below.

Our financial results are subject to U.S. economic uncertainty.

In 2018, we generated approximately 78% of our net sales in the U.S. Our ability to be profitable depends heavily on varying conditions in the U.S. governmental and municipal markets, as well as the overall U.S. economy. The industrial markets in which we compete are subject to considerable cyclicity, and move in response to cycles in the overall business environment. Many of our customers are municipal government agencies, and as a result, we are dependent on municipal government spending. Spending by our municipal customers can be affected by federal, state and local political circumstances, budgetary constraints, changing priorities, actual or potential government shutdowns and other factors. The U.S. government and municipalities depend heavily on tax revenues as a source of spending and accordingly, there is a historical correlation that suggests a lag of one to two years between the condition of the U.S. economy and our sales to the U.S. government and municipalities. Therefore, downturns in the U.S. economy are likely to result in decreases in demand for our products. During previous economic downturns, we experienced decreases in sales and profitability, and we expect our business to remain subject to similar economic fluctuations in the future. In addition, the Tax Cuts and Jobs Act of 2017 (the “2017 Tax Act”) may result in changes in federal, state and local tax revenues which could impact governmental spending and demand for our products.

We have international operations that are subject to compliance with domestic and foreign laws and regulations, economic and political uncertainties and foreign currency rate fluctuations.

Our business is subject to fluctuations in demand and changing international economic, legal and political conditions that are beyond our control. In 2018, approximately 22% of our net sales were to customers outside the U.S. and we expect a significant portion of our revenues to come from international sales in the foreseeable future. Operating in the international marketplace exposes us to a number of risks, including the need to comply with U.S. and foreign laws and regulations applicable to our foreign operations, such as the Foreign Corrupt Practices Act, the United Kingdom (“U.K.”) Bribery Act and their counterparts in other foreign jurisdictions in which we operate, restrictive domestic and international trade regulations, changes in these laws, regulations and policies by the U.S. and foreign governments. In addition, we may be exposed to risks associated with actual or threatened imposition of tariffs or trade barriers on our products or materials incorporated into our products, actual or threatened trade disputes, including so-called “trade wars,” political and economic instability in the jurisdictions in which we operate, foreign receivables collection risk, local labor market conditions, and, in some cases, international hostilities. The costs of compliance with these various laws, regulations and policies can be significant and penalties for non-compliance could significantly impact our business.

To the extent that our international operations are affected by adverse foreign economic or political conditions, we may experience disruptions and losses which could have a material impact on our financial position, results of operations or cash flow. To mitigate the risk of foreign receivables collection, we may obtain letters of credit from international customers to satisfy concerns regarding the collectability of amounts billed to customers.

Some of our contracts are denominated in foreign currencies, which may expose us to risks of fluctuating currency values and exchange rates, hard currency shortages and controls on currency exchange. Changes in the value of foreign currencies over the long term could increase our U.S. dollar costs for, or reduce our U.S. dollar revenues from, our foreign operations. Any increased costs or reduced revenues as a result of foreign currency fluctuations could adversely affect our results of operations.

We are subject to a number of restrictive debt covenants.

Our credit facility contains certain restrictive debt covenants and customary events of default. Our ability to comply with these restrictive covenants may be affected by the other factors described in this “Risk Factors” section, as well as other factors outside of our control. Failure to comply with one or more of these restrictive covenants may result in an event of default which, if not cured by us or waived by our lenders, allows our lenders to declare all amounts outstanding as due and payable. Such an acceleration of the maturity of our indebtedness may cause us to incur substantial costs and may prevent or limit us from engaging in transactions that benefit us, including responding to changing business and economic conditions and taking advantage of attractive business opportunities.

Table of Contents

The execution of our growth strategy is dependent upon the continued availability of credit and third-party financing arrangements for our customers.

Economic downturns result in tighter credit markets, which could adversely affect our customers' ability to secure financing or to secure financing at favorable terms or interest rates necessary to proceed or continue with purchases of our products and services. Our customers' or potential customers' inability to secure financing for projects could result in the delay, cancellation or downsizing of new purchases or the suspension of purchases already under contract, which could cause a decline in the demand for our products and services and negatively impact our financial position, results of operations or cash flow.

Our efforts to develop new products and services or enhance existing products and services involve substantial research, development and marketing expenses, and the resulting new or enhanced products or services may not generate sufficient revenues to justify the expense.

We place a high priority on developing new products and services, as well as enhancing our existing products and services. As a result of these efforts, we may be required to expend substantial research, development and marketing resources, and the time and expense required to develop a new product or service or enhance an existing product or service are difficult to predict. We may not succeed in developing, introducing or marketing new products or services or product or service enhancements. In addition, we cannot be certain that any new or enhanced product or service will generate sufficient revenue to justify the expense and resources devoted to the related product diversification effort.

We could incur restructuring and impairment charges as we continue to evaluate opportunities to restructure our business and rationalize our manufacturing operations in an effort to optimize our cost structure.

We continue to evaluate opportunities to restructure our business and rationalize our manufacturing operations in an effort to optimize our cost structure. These actions could result in significant charges that could adversely affect our financial condition and results of operations. Future actions could result in restructuring and related charges, including but not limited to impairments, employee termination costs and charges for pension and other postretirement contractual benefits and pension curtailments that could be significant and could have an adverse effect on our financial condition, results of operations or cash flow.

We operate in highly competitive markets.

The markets in which we operate are highly competitive. Many of our competitors have significantly greater financial resources than we do. The intensity of this competition, which is expected to continue, can result in price discounting and margin pressures throughout the industry and may adversely affect our ability to increase or maintain prices for our products. In addition, certain of our competitors may have lower overall labor or material costs. In some cases, our contracts with municipal and other governmental customers are awarded and renewed through competitive bidding. We may not be successful in obtaining or renewing these contracts, which could have an adverse effect on our financial condition, results of operations or cash flow.

We may incur material losses and costs as a result of lawsuits or claims that may be brought against us which are related to product liability, warranty, product recalls, client service interruptions or other matters.

We are exposed to product liability and warranty claims in the normal course of business in the event that our products actually or allegedly fail to perform as expected, or the use of our products results, or is alleged to result, in bodily injury and/or property damage. For example, we have been sued by firefighters seeking damages claiming that exposure to our sirens has impaired their hearing and that the sirens are, therefore, defective. In addition, we are subject to other claims and litigation from time to time as further described in the accompanying notes to our consolidated financial statements. We could experience material warranty or product liability costs in the future and incur significant costs to defend ourselves against these claims. While we carry insurance and maintain reserves for product liability claims, our insurance coverage may be inadequate if such claims do arise, and any defense costs and liability not covered by insurance could have a material adverse impact on our financial condition, results of operations or cash flow. A future claim could involve the imposition of punitive damages, the award of which, pursuant to state laws, may not be covered by insurance. In addition, warranty and certain other claims are not

typically covered by insurance. Any product liability or warranty issues may adversely impact our reputation as a manufacturer of high quality, safe products and may have a material adverse effect on our business.

Failure to keep pace with technological developments may adversely affect our operations.

We are engaged in an industry that will be affected by future technological developments. The introduction of products or processes utilizing new technologies could render our existing products or processes obsolete or unmarketable. Our success will depend upon our ability to develop and introduce on a timely and cost-effective basis new products, applications and

Table of Contents

processes that keep pace with technological developments and address increasingly sophisticated customer requirements. We may not be successful in identifying, developing and marketing new products, applications and processes and product or process enhancements. We may experience difficulties that could delay or prevent the successful development, introduction and marketing of product or process enhancements or new products, applications or processes. Our products, applications or processes may not adequately meet the requirements of the marketplace and achieve market acceptance. Our financial condition, results of operations or cash flow could be materially and adversely affected if we were to incur delays in developing new products, applications or processes or product or process enhancements, or if our products do not gain market acceptance.

Increased information technology security threats and more sophisticated cyber-attacks pose a risk to our systems, networks, products and operations.

We have observed a global increase in information technology security threats and more sophisticated cyber-attacks. Our business could be impacted by such disruptions, which in turn could pose a risk to the security of our systems and networks and the confidentiality, accessibility and integrity of information stored and transmitted on those systems and networks. We have adopted measures to address cyber-attacks and mitigate potential risks to our systems from these information technology-related disruptions. However, given the unpredictability of the timing, nature and scope of such disruptions, our systems and networks remain potentially vulnerable to attacks. Depending on their nature and scope, such attacks could potentially lead to the compromising of confidential information, misuse of our systems and networks, manipulation and destruction of data, misappropriation of assets or production stoppages and supply shortages, which in turn could adversely affect our reputation, financial condition, results of operations or cash flow.

Infringement of, or an inability to protect, our intellectual property rights could adversely affect our business.

We rely on a combination of patents, trademarks, copyrights, nondisclosure agreements, information technology security systems, physical security and other measures to protect our proprietary intellectual property and the intellectual property of certain customers and suppliers. However, we cannot be certain that our efforts to protect these intellectual property rights will be sufficient. Intellectual property protection is subject to applicable laws in various jurisdictions where interpretations and protections differ or can be unpredictable and costly to enforce. Further, our ability to protect our intellectual property rights may be limited in certain foreign jurisdictions that do not have, or do not enforce, strong intellectual property rights. Any failure to protect or enforce our intellectual property rights could have a material adverse effect on our competitive position, financial condition, results of operations or cash flow.

The inability to obtain raw materials, component parts and/or finished goods in a timely and cost-effective manner would adversely affect our ability to manufacture and market our products.

We purchase from suppliers raw materials, component parts and finished goods to be used in the manufacturing and sale of our products. In addition, we may incorporate vehicle chassis provided directly by our customers in our production process. Changes in our relationships with suppliers, shortages or production delays, whether due to our suppliers or customers, regulatory restrictions or work stoppages by the employees of our suppliers or the chassis suppliers for our customers could have a material adverse effect on our ability to timely manufacture and market products. In addition, increases in the costs of purchased raw materials, component parts or finished goods could result in manufacturing interruptions, delays, inefficiencies or our inability to market products. In addition, our profit margins would decrease if prices of purchased raw materials, component parts or finished goods increase and we are unable to pass on those increases to our customers.

Our ability to operate effectively could be impaired if we fail to attract and retain key personnel.

Our ability to operate our businesses and implement our strategies depends in part on the efforts of our executive officers and other key employees. In addition, our future success will depend on, among other factors, our ability to attract and retain qualified personnel. The loss of the services of any key employee or the failure to attract or retain other qualified personnel could have a material adverse effect on our business or business prospects.

Disruptions within our dealer network or the inability of our dealers to secure adequate access to capital could adversely affect our business.

We rely on national and global dealer networks to market certain of our products and services. A disruption in our dealer network, or with a significant dealer, or within a specific market, could have an adverse impact on our business within the affected market. In addition, our dealers require adequate liquidity to finance their operations, including purchases of our products. Dealers are subject to numerous risks and uncertainties that could unfavorably affect their liquidity positions, including, among other things, continued access to adequate financing sources on a timely basis on reasonable terms. These sources of financing are vital to our ability to sell products through our dealer network. Deterioration in the liquidity or credit worthiness of our dealers could have a significant adverse effect on our business. The loss or termination of a significant dealer,

Table of Contents

or a significant number of dealers, could cause difficulties in marketing and distributing our products and have an adverse effect on our business, financial condition, results of operations or cash flow.

Our business may be adversely impacted by work stoppages and other labor relations matters.

As a portion of our workforce is unionized, we are subject to risk of work stoppages and other labor relations matters. As of December 31, 2018, approximately 17% of our U.S. hourly workers were represented by labor unions and were covered by collective bargaining agreements with various unions. Many of these agreements include provisions that limit our ability to realize cost savings. Our current collective bargaining agreement with the International Brotherhood of Electrical Workers is due to expire in April 2019. Any strikes, threats of strikes or other organized disruptions in connection with the negotiation of new labor agreements or other negotiations could materially adversely affect our business as well as impair our ability to implement further measures to reduce costs and improve production efficiencies.

Our pension funding requirements and expenses are affected by certain factors outside of our control, including the performance of plan assets, the discount rate used to value liabilities, actuarial assumptions and experience and legal and regulatory changes.

Our funding obligations and pension expense for our defined benefit pension plans are driven by the performance of assets set aside in trusts for these plans, the discount rate used to value the plans' liabilities, actuarial assumptions and experience and legal and regulatory funding requirements. Changes in these factors could have an adverse impact on our financial condition, results of operations or cash flow. In addition, a portion of our pension plan assets are invested in equity securities, which can experience significant declines if financial markets weaken. The level of the funding of our defined benefit pension plan liabilities was approximately 79% as of December 31, 2018. Funding of the Company's U.S. defined benefit pension plan is determined in accordance with guidelines set forth in the Employee Retirement Income Security Act ("ERISA"). The current year funding status was impacted by a lower discount rate than in the prior year. Our future pension expenses and funding requirements could increase significantly due to the effect of adverse changes in the discount rate, asset values or the estimated expected return on plan assets. In addition, we could become legally required to make increased cash contributions to the pension plans, and these contributions could be material and negatively affect our cash flow.

The costs associated with complying with environmental and safety regulations could lower our margins.

We, like other manufacturers, continue to face heavy governmental regulation of our products, especially in the areas of the environment and employee health and safety. Complying with environmental and safety requirements has added and will continue to add to the cost of our products, and could increase the capital required to support our business. While we believe that we are in compliance in all material respects with these laws and regulations, we may be adversely impacted by costs, liabilities or claims with respect to our operations under existing laws or those that may be adopted. These requirements are complex, change frequently and have tended to become more stringent over time. Therefore, we could incur substantial costs, including cleanup costs, fines and civil or criminal sanctions as a result of violation of, or liabilities under, environmental laws and safety regulations. These requirements may increase the cost of our products, which may diminish demand for those products. In addition, uneven application of environmental or safety regulations could place our products at a cost or features disadvantage, which could reduce our revenues and profitability.

An impairment in the carrying value of goodwill, intangible assets or long-lived assets could negatively affect our financial position and results of operations.

As of December 31, 2018, goodwill and intangible assets represented 37% and 14% of total consolidated assets, respectively. Rental equipment and properties and equipment are long-lived assets which also represented more than 5% of our total consolidated assets as of December 31, 2018. Goodwill and indefinite-lived intangible assets are tested for impairment annually, or more frequently if indicators of impairment exist. Definite-lived intangible assets and long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. In evaluating the potential for impairment of goodwill, intangible assets and long-lived assets, we make assumptions regarding future operating performance, business trends, competition and

market and general economic conditions. Such analyses further require us to make certain assumptions about our sales, operating margins, growth rates and discount rates. There are inherent uncertainties related to these factors. An impairment charge may result from, among other things, a significant decline in operating results, adverse market conditions, unfavorable changes in applicable laws or regulations, or a variety of other factors. Our total consolidated assets and results of operations for the applicable period could be materially adversely affected if any such charge is recorded.

Table of Contents

We may be unsuccessful in our future acquisitions, if any, which may have an adverse effect on our business. Our long-term strategy includes exploring acquisitions of companies or businesses to facilitate our growth, enhance our global market position and broaden our product offerings. Such acquisitions may help us expand into adjacent markets, add complementary products and services or allow us to leverage our distribution channels. In connection with this strategy, we could face certain risks and uncertainties in addition to those we face in the day-to-day operations of our business. We also may be unable to identify suitable targets for acquisition or to make acquisitions at favorable prices. If we identify a suitable acquisition candidate, our ability to successfully implement the acquisition would depend on a variety of factors, including our ability to obtain financing on acceptable terms. In addition, our acquisition activities could be disrupted by overtures from competitors for the targeted companies, governmental regulation and rapid developments in our industry that decrease the value of a potential target's products or services.

Acquisitions involve risks, including those associated with the following:

- integrating the operations, financial reporting, disparate systems and processes and personnel of acquired companies;
- managing geographically dispersed operations;
- diverting management's attention from other business concerns;
- changing the competitive landscape, including disrupting existing sales channels or markets;
- entering markets or lines of business in which we have either limited or no direct experience; and
- losing key employees, customers and strategic partners of acquired companies.

We also may not achieve anticipated revenue and cost benefits associated with our acquisitions. Acquisitions may not be accretive to our earnings and may negatively impact our results of operations as a result of, among other things, the incurrence of debt, acquisition costs, impairment of goodwill and amortization of other intangible assets. In addition, future acquisitions could result in dilutive issuances of equity securities.

Businesses acquired by us may have liabilities that are not known to us.

We may assume liabilities in connection with the acquisition of businesses. There may be liabilities that we fail or are unable to discover in the course of performing due diligence investigations on the acquired businesses, or that may be more material than we discovered. In these circumstances, we cannot assure that our rights to indemnification will be sufficient in amount, scope or duration to fully offset the possible liabilities associated with the businesses or property acquired. Further, these liabilities could result in unexpected legal or regulatory exposure, unexpected increases in taxes or other adverse effects on our business. Any such liabilities, individually or in the aggregate, could have a material adverse effect on our financial condition, results of operations or cash flow.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

As of December 31, 2018, the Company utilized ten principal manufacturing plants located throughout the U.S., as well as two in Europe, one in Canada and one in South Africa. The Company also leases facilities within the U.S., Europe and Canada from which we provide sales, service and/or equipment rentals. As of December 31, 2018, the Company devoted approximately 1.6 million square feet to manufacturing and 0.8 million square feet to sales, service, warehousing and office space. Of the total square footage, approximately 78% is devoted to the Environmental Solutions Group and 22% to the Safety and Security Systems Group. Approximately 42% of the total square footage is owned by the Company with the remaining 58% being leased. Owned facilities are subject to lien under the Company's Amended and Restated Credit Agreement dated January 27, 2016 (as amended on June 2, 2017, the "Amended 2016 Credit Agreement").

The Company believes its properties, and related machinery and equipment, are well-maintained, suitable and adequate for their intended purposes. In the aggregate, these facilities are of sufficient capacity for the Company's current business needs. However, the Company may make additional investments in certain facilities in the future in response to increased demand for the Company's products.

Item 3. Legal Proceedings.

The information concerning the Company's legal proceedings included in Note 12 – Legal Proceedings to the accompanying consolidated financial statements is incorporated herein by reference.

Table of Contents

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market Information

The Company's common stock is listed and traded on the New York Stock Exchange ("NYSE") under the symbol "FSS".
 Holders

As of January 31, 2019, there were 1,571 holders of record of the Company's common stock.

Securities Authorized for Issuance under Equity Compensation

Information concerning the Company's equity compensation plans is included under Item 12 of Part III of this Form 10-K.

Recent Sales of Unregistered Securities

There were no sales of unregistered securities by the Company during the year ended December 31, 2018.

Purchases of Equity Securities

The following table provides a summary of the Company's repurchase activity for its common stock during the three months ended December 31, 2018:

Period	Total Number of Shares Purchased	Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Dollar Value of Shares That May Yet Be Purchased Under the Plans or Programs ^(a)
October 2018 (9/30/18 - 11/3/18)	—	\$ —	—	\$31,395,802
November 2018 (11/4/18 - 12/1/18)	—	—	—	31,395,802
December 2018 (12/2/18 - 12/31/18)	62,500	19.7920	62,500	30,158,802

^(a) On November 4, 2014, the Board authorized a stock repurchase program of up to \$75.0 million of the Company's common stock.

Table of Contents

Performance Graph

The following graph compares the cumulative five-year total return to stockholders of the Company's common stock relative to the cumulative total returns of the Russell 2000 index, the S&P Midcap 400 index and the S&P Industrials index. The graph assumes that the value of the investment in the Company's common stock, and in each index, was \$100 on December 31, 2013 and assumes reinvestment of all dividends through December 31, 2018.

Copyright© 2019 Russell Investment Group. All rights reserved.

Copyright© 2019 Standard & Poor's, a division of S&P Global. All rights reserved.

	As of December 31,					
	2013	2014	2015	2016	2017	2018
Federal Signal Corporation	\$ 100.00	\$ 106.04	\$ 110.64	\$ 111.22	\$ 145.48	\$ 146.03
Russell 2000	100.00	104.89	100.26	121.63	139.44	124.09
S&P Midcap 400	100.00	109.77	107.38	129.65	150.71	134.01
S&P Industrials	100.00	109.83	107.04	127.23	153.99	133.53

The stock price performance included in this graph is not necessarily indicative of future stock price performance.

Notwithstanding anything set forth in any of our previous filings under the Securities Act or the Exchange Act, which might be incorporated into future filings in whole or part, including this Form 10-K, the preceding performance graph shall not be deemed incorporated by reference into any such filings.

Table of Contents

Item 6. Selected Financial Data.

The following table summarizes selected financial information of the Company as of, and for each of the five years in the period ended, December 31, 2018:

(\$ in millions, except per share data)	For the Years Ended December 31,				
	2018	2017	2016	2015	2014
Results of Operations:					
Net sales	\$1,089.5	\$898.5	\$707.9	\$768.0	\$779.1
Operating income ^{(a) (b) (c) (d)}	121.5	73.6	60.8	107.4	92.0
Income from continuing operations ^{(a) (b) (c) (d) (e)}	93.7	60.5	39.4	65.8	59.7
Gain (loss) from discontinued operations and disposal, net of tax	0.3	1.1	4.4	(2.3)	4.0
Net income ^{(a) (b) (c) (d) (e)}	\$94.0	\$61.6	\$43.8	\$63.5	\$63.7
Financial Position:					
Capital expenditures	\$14.1	\$8.0	\$6.1	\$9.6	\$13.7
Depreciation and amortization	36.4	30.0	19.1	12.3	11.5
Total assets	1,023.8	992.3	643.2	666.5	658.7
Total debt ^(f)	210.1	277.7	64.0	44.1	50.2
Common Stock Data:					
Diluted earnings per share — continuing operations	\$1.53	\$1.00	\$0.64	\$1.04	\$0.94
Cash dividends per common share	0.31	0.28	0.28	0.25	0.09
Weighted average shares outstanding — diluted (in millions)	61.2	60.4	61.2	63.4	63.6
Performance Measures:					
Operating margin	11.2	% 8.2	% 8.6	% 14.0	% 11.8
Adjusted EBITDA ^(g)	\$160.5	\$113.5	\$86.6	\$120.1	\$103.5
Adjusted EBITDA margin ^(g)	14.7	% 12.6	% 12.2	% 15.6	% 13.3
Other Data:					
Total orders	\$1,173.2	\$1,018.0	\$674.4	\$686.1	\$807.4
Backlog	337.7	257.5	137.0	171.3	254.7

2018 operating income includes acquisition and integration-related expenses of \$1.5 million. 2018 income from (a) continuing operations includes the after-tax effects of the acquisition and integration-related expenses, as well as an \$8.6 million net benefit associated with tax planning strategies.

2017 operating income includes acquisition and integration-related expenses and restructuring charges of \$2.7 million and \$0.6 million, respectively. 2017 income from continuing operations includes the after-tax effects of the (b) acquisition and integration-related expenses, restructuring charges and pension settlement charges of \$6.1 million, as well as a \$20.2 million net benefit from special tax items, primarily represented by the Company's preliminary estimate of the impact of the 2017 Tax Act, including the effect of the reduction in the corporate tax rate in the U.S.

2016 operating income includes acquisition and integration-related expenses and restructuring charges of \$1.4 million and \$1.7 million, respectively. 2016 income from continuing operations includes the after-tax effects of the (c) acquisition and integration-related expenses and restructuring charges and also \$0.3 million of debt settlement charges, and a \$2.2 million net benefit resulting from changes in deferred tax valuation allowances in Canada and the U.K.

2015 operating income includes restructuring charges of \$0.4 million. 2015 income from continuing operations includes the after-tax effects of the restructuring charges, as well as a \$1.4 million net benefit from special tax (d) items, comprised of a \$4.2 million net tax benefit associated with tax planning strategies, offset by a \$2.4 million adjustment of deferred tax assets and \$0.4 million of expense associated with a change in the enacted tax rate in the U.K.

- (e) 2014 income from continuing operations includes the effects of a \$3.5 million release of valuation allowance that was previously recorded against the Company's foreign deferred tax assets.
- (f) Includes short-term borrowings, the current portion of long-term borrowings and capital lease obligations of \$0.2 million, \$0.3 million, \$0.5 million, \$0.4 million and \$6.2 million, respectively.

Table of Contents

The Company uses adjusted EBITDA and the ratio of adjusted EBITDA to net sales (“adjusted EBITDA margin”) as additional measures which are representative of its underlying performance and to improve the comparability of results across reporting periods. We believe that investors use versions of these metrics in a similar manner. For these reasons, the Company believes that adjusted EBITDA and adjusted EBITDA margin are meaningful metrics to investors in evaluating the Company’s underlying financial performance. Consolidated adjusted EBITDA is a non-GAAP measure that represents the total of income from continuing operations, interest expense, pension settlement charges, hearing loss settlement charges, debt settlement charges, acquisition and integration-related expenses, restructuring activity, executive severance costs, purchase accounting effects, other income/expense, (g) income tax expense, and depreciation and amortization expense. Consolidated adjusted EBITDA margin is a non-GAAP measure that represents the total of income from continuing operations, interest expense, pension settlement charges, hearing loss settlement charges, debt settlement charges, acquisition and integration-related expenses, restructuring activity, executive severance costs, purchase accounting effects, other income/expense, income tax expense, and depreciation and amortization expense divided by net sales for the applicable period(s). Other companies may use different methods to calculate adjusted EBITDA and adjusted EBITDA margin. The following table summarizes the Company’s consolidated adjusted EBITDA and adjusted EBITDA margin and reconciles income from continuing operations to consolidated adjusted EBITDA for each of the five years in the period ended December 31, 2018:

(\$ in millions)	For the Years Ended December 31,					
	2018	2017	2016	2015	2014	
Income from continuing operations	\$93.7	\$60.5	\$39.4	\$65.8	\$59.7	
Add:						
Interest expense	9.3	7.3	1.9	2.3	3.6	
Pension settlement charges	—	6.1	—	—	—	
Hearing loss settlement charges	0.4	1.5	—	—	—	
Debt settlement charges	—	—	0.3	—	—	
Acquisition and integration-related expenses	1.5	2.7	1.4	—	—	
Restructuring	—	0.6	1.7	0.4	—	
Executive severance costs	—	0.7	—	—	—	
Purchase accounting effects *	0.7	4.4	3.6	—	—	
Other expense (income), net	0.6	(0.8)	1.8	5.2	5.0	
Income tax expense	17.9	0.5	17.4	34.1	23.7	
Depreciation and amortization	36.4	30.0	19.1	12.3	11.5	
Adjusted EBITDA	\$160.5	\$113.5	\$86.6	\$120.1	\$103.5	
Net sales	\$1,089.5	\$898.5	\$707.9	\$768.0	\$779.1	
Adjusted EBITDA margin	14.7	% 12.6	% 12.2	% 15.6	% 13.3	%

*Purchase accounting effects represent the step-up in the valuation of equipment acquired in recent business combinations that was sold during the periods presented within.

The selected financial data set forth above should be read in conjunction with the Company’s consolidated financial statements, including the notes thereto, and management’s discussion and analysis of financial condition and results of operations, included under Item 8 of Part II of this Form 10-K and Item 7 of Part II of this Form 10-K, respectively.

Table of Contents

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

Management's Discussion and Analysis of Financial Condition and Results of Operations ("MD&A") is designed to provide information that is supplemental to, and shall be read together with, the consolidated financial statements and the accompanying notes contained in this Form 10-K. Information in MD&A is intended to assist the reader in obtaining an understanding of (i) the consolidated financial statements, (ii) the Company's business segments and how the results of those segments impact the Company's results of operations and financial condition as a whole and (iii) how certain accounting principles affect the Company's consolidated financial statements.

Executive Summary

The Company is a leading global manufacturer and supplier of (i) vehicles and equipment for maintenance and infrastructure end-markets, including sewer cleaners, vacuum trucks, street sweepers, dump truck bodies and trailers and (ii) safety, security and communication equipment, such as lights, sirens and warning systems. In addition, we sell parts and provide service, repair, equipment rentals and training as part of a comprehensive aftermarket offering to our customer base. We operate 14 manufacturing facilities in five countries and provide products and integrated solutions to municipal, governmental, industrial and commercial customers in all regions of the world.

As described in Note 16 – Segment Information to the accompanying consolidated financial statements, the Company's business units are organized in two reportable segments: the Environmental Solutions Group and the Safety and Security Systems Group.

During 2018, the Company continued to focus on executing against its key long-term objectives, including the following:

• Creating disciplined growth;

- Improving manufacturing efficiencies and costs;

• Leveraging invested capital; and

• Diversifying our customer base.

Highlights of the Company's achievement against these objectives in 2018 include the following:

With the traction on our organic growth initiatives, and benefits from the 2017 acquisition of TBEI, we accelerated the achievement of our goal of profitably growing our revenues in excess of \$1 billion by 2020. Our net sales for the year ended December 31, 2018 increased to \$1,089.5 million.

We generated \$93.7 million of Income from continuing operations during the year ended December 31, 2018, an increase of \$33.2 million, or 55%, compared with \$60.5 million in 2017.

On a consolidated basis, our adjusted EBITDA* increased by \$47.0 million, or 41%, and our adjusted EBITDA margin* for 2018 was 14.7%, up from 12.6% in 2017.

Both of our groups reported significant improvement in net sales and earnings, delivering adjusted EBITDA margins* towards the high end of our target ranges.

We have continued to focus on new product development and are encouraged that these efforts will provide additional opportunities to further diversify our customer base. In particular, we are pleased with the market reaction to our new hydro-excavator vehicle designed for utility markets.

Our eighty-twenty improvement ("ETI") initiatives remain a critical part of our culture and we continue to focus on reducing product costs and improving manufacturing efficiencies across all our businesses.

With \$92.8 million of cash being generated from continuing operations during 2018, we have been able to pay down \$62.1 million of debt in 2018, bringing our total debt repayment since the completion of the TBEI acquisition in June 2017 to approximately \$96.0 million.

During the year, we demonstrated our commitment to returning value to stockholders by paying increased cash dividends of \$18.7 million in 2018, up from \$16.8 million in 2017.

We also spent \$1.2 million repurchasing shares under our authorized repurchase program. At the end of 2018, we had \$30.2 million of authorization remaining under our existing share repurchase program, which represents approximately 2% of our market capitalization.

With our strong balance sheet and positive operating cash flow, we are well positioned to continue to invest in internal growth initiatives, pursue strategic acquisitions and consider ways to return value to stockholders.

Table of Contents

Our consolidated financial results in 2018 reflected year-over-year improvement in many areas, driven by both organic growth and benefits from our recent acquisitions:

• Net sales for the year ended December 31, 2018 increased by \$191.0 million, or 21%, to \$1,089.5 million, with organic sales growth of approximately 12%.

• Operating income for the year ended December 31, 2018 increased by \$47.9 million, or 65%, to \$121.5 million.

• Adjusted EBITDA* for the year ended December 31, 2018 was \$160.5 million, up \$47.0 million, or 41%, and our adjusted EBITDA margin* for the year ended December 31, 2018 was 14.7%, up from 12.6% in 2017.

Income from continuing operations for the year ended December 31, 2018 was \$93.7 million, up \$33.2 million, or 55%, from \$60.5 million in the prior year. This equated to diluted earnings per share of \$1.53, up 53% from \$1.00 per share last year.

• Cash flow from continuing operating activities for the year ended December 31, 2018 was \$92.8 million, an increase of \$19.3 million, or 26%.

• Total orders for the year ended December 31, 2018 were \$1,173.2 million, an increase of \$155.2 million, or 15%.

• Our consolidated backlog at December 31, 2018 was \$337.7 million, up \$80.2 million, or 31%, from \$257.5 million at December 31, 2017.

* The Company uses adjusted EBITDA and adjusted EBITDA margin as additional measures which are representative of its underlying performance and to improve the comparability of results across reporting periods. Refer to Item 6. Selected Financial Data for further discussion regarding these non-GAAP metrics and a reconciliation of each to the most comparable GAAP measure for each of the periods presented.

Table of Contents

Results of Operations

The following table summarizes our Consolidated Statements of Operations and illustrates the key financial indicators used to assess our consolidated financial results:

(\$ in millions, except per share data)	For the Years Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Net sales	\$1,089.5	\$898.5	\$707.9	\$191.0	\$190.6
Cost of sales	807.4	677.3	524.5	130.1	152.8
Gross profit	282.1	221.2	183.4	60.9	37.8
Selling, engineering, general and administrative expenses	159.1	144.3	119.5	14.8	24.8
Acquisition and integration-related expenses	1.5	2.7	1.4	(1.2)	1.3
Restructuring	—	0.6	1.7	(0.6)	(1.1)
Operating income	121.5	73.6	60.8	47.9	12.8
Interest expense	9.3	7.3	1.9	2.0	5.4
Debt settlement charges	—	—	0.3	—	(0.3)
Pension settlement charges	—	6.1	—	(6.1)	6.1
Other expense (income), net	0.6	(0.8)	1.8	1.4	(2.6)
Income before income taxes	111.6	61.0	56.8	50.6	4.2
Income tax expense	17.9	0.5	17.4	17.4	(16.9)
Income from continuing operations	93.7	60.5	39.4	33.2	21.1
Gain from discontinued operations and disposal, net of tax	0.3	1.1	4.4	(0.8)	(3.3)
Net income	\$94.0	\$61.6	\$43.8	\$32.4	\$17.8
Other data:					
Operating margin	11.2	% 8.2	% 8.6	% 3.0	% (0.4)%
Adjusted EBITDA ^(a)	\$160.5	\$113.5	\$86.6	\$47.0	\$26.9
Adjusted EBITDA margin ^(a)	14.7	% 12.6	% 12.2	% 2.1	% 0.4
Diluted earnings per share — Continuing operations	\$1.53	\$1.00	\$0.64	\$0.53	\$0.36
Total orders	1,173.2	1,018.0	674.4	155.2	343.6
Backlog	337.7	257.5	137.0	80.2	120.5
Depreciation & amortization	36.4	30.0	19.1	6.4	10.9

The Company uses adjusted EBITDA and adjusted EBITDA margin as additional measures which are representative of its underlying performance and to improve the comparability of results across reporting periods. ^(a) Refer to Item 6. Selected Financial Data for further discussion regarding these non-GAAP metrics and a reconciliation of each to the most comparable GAAP measure for each of the periods presented.

Year ended December 31, 2018 vs. year ended December 31, 2017

Net sales

Net sales increased by \$191.0 million, or 21%, for the year ended December 31, 2018, compared to the prior year. Within the Environmental Solutions Group, net sales increased by \$170.9 million, or 25%, largely due to \$98.1 million of incremental net sales resulting from the prior-year TBEI acquisition and organic sales growth of \$72.8 million, or 12%. The organic growth was primarily due to improved shipments of vacuum trucks and sewer cleaners, in addition to higher aftermarket revenues, represented by increases in rental income, parts and services revenues and sales of used equipment. These improvements included benefits from pricing actions and were partially offset by lower sales of products manufactured by other companies, such as refuse trucks. In the Safety and Security Systems Group, net sales increased by \$20.1 million, or 10%, primarily due to higher sales into global public safety markets and improved international sales of outdoor warning systems.

Cost of sales

For the year ended December 31, 2018, cost of sales increased by \$130.1 million, or 19%, compared to the prior year, largely due to an increase of \$117.1 million, or 21%, within the Environmental Solutions Group, primarily driven by increased sales volumes, the effects of a full-year of TBEI activity in the current-year period compared with seven months in the prior year, higher material costs and a \$3.7 million increase in depreciation expense, partially offset by a \$3.7 million reduction in

Table of Contents

purchase accounting expenses. Within the Safety and Security Systems Group, cost of sales increased by \$13.0 million, or 10%, largely driven by higher sales volumes and unfavorable foreign currency translation effects.

Gross profit

For the year ended December 31, 2018, gross profit increased by \$60.9 million, or 28%, compared to the prior year, primarily due to improvements of \$53.8 million and \$7.1 million within the Environmental Solutions Group and the Safety and Security Systems Group, respectively. Gross margin for the year ended December 31, 2018 was 25.9%, compared to 24.6% in the prior year, primarily driven by a 210 basis point gross margin improvement within the Environmental Solutions Group, associated with improved operating leverage, benefits from actions taken in response to higher commodity costs, favorable sales mix and the reduction in purchase accounting expenses, described above, partially offset by the higher depreciation expense.

Selling, engineering, general and administrative expenses

For the year ended December 31, 2018, SEG&A expenses increased by \$14.8 million, or 10%, primarily represented by a \$13.2 million increase within the Environmental Solutions Group, largely the result of the addition of expenses of associated with the TBEI acquisition, including an increase in amortization expense of \$3.2 million. SEG&A expenses within the Safety and Security Systems Group increased by \$0.6 million, primarily due to higher expenses associated with new product development and other growth initiatives, while corporate SEG&A expenses increased by \$1.0 million. As a percentage of net sales, SEG&A expenses decreased from 16.1% in the prior year, to 14.6% in the current year.

Operating income

Operating income for the year ended December 31, 2018 increased by \$47.9 million, or 65%, to \$121.5 million, compared to the prior year. Within our Environmental Solutions Group, operating income for the year ended December 31, 2018 increased by \$40.6 million, or 56%, with higher sales volumes, improved operating leverage and an incremental operating income contribution of \$9.5 million from TBEI, associated with including a full-year of activity in 2018, compared to only seven months in the prior year. TBEI's operating income contribution in 2018 included the effects of amortization expense on intangible assets acquired, which contributed to an increase in depreciation and amortization expense of \$6.9 million. Within our Safety and Security Systems Group, operating income for the year ended December 31, 2018 increased by \$7.1 million, or 26%, while corporate expenses decreased by \$0.2 million, primarily driven by a \$1.2 million decrease in acquisition and integration-related expenses, reductions in hearing loss litigation and post-employment expenses and the absence of \$0.7 million in executive severance costs, partially offset by higher employee incentive and stock compensation costs. Consolidated operating margin for the year ended December 31, 2018 was 11.2%, compared to 8.2% in the prior year.

Interest expense

Interest expense for the year ended December 31, 2018 increased by \$2.0 million, or 27%, compared to the prior year, largely due to higher average debt levels following the acquisition of TBEI in June 2017. For further discussion, see Note 8 – Debt to the accompanying consolidated financial statements.

Other expense (income), net

For the year ended December 31, 2018, Other expense (income), net, totaled \$0.6 million of expense, largely due to foreign currency transaction losses and \$0.4 million of net periodic pension expense. For the year ended December 31, 2017, \$0.8 million of income was reported, largely due to foreign currency transaction gains, which were partially offset by \$0.4 million of net periodic pension expense.

Income tax expense

The Company recognized income tax expense of \$17.9 million for the year ended December 31, 2018, compared to \$0.5 million for the year ended December 31, 2017. The increase in income tax expense was primarily due to higher earnings, and the impact of certain special tax items in the prior year, which did not repeat in 2018. In addition, during the year ended December 31, 2018, the Company recognized a tax benefit of \$8.6 million associated with the completion of a tax planning strategy in Spain, which is expected to reduce cash tax payments in that jurisdiction over the next several years. Tax expense for the year ended December 31, 2017 was lower than in 2018, largely due to the

recognition of a \$23.0 million net tax benefit associated with the revaluation of the Company's net deferred tax liabilities in the U.S. following the reduction of the federal corporate tax rate included in the 2017 Tax Act. This benefit was partially offset by a \$2.2 million net increase in valuation allowance, inclusive of a \$3.0 million valuation allowance recorded against the Company's foreign tax credits as a result of the enactment of the 2017 Tax Act, the recognition of \$0.6 million of additional tax expense associated with a change in the state tax rate in Illinois, and additional taxes resulting from higher pre-tax earnings. The Company's effective tax rate for the year

Table of Contents

ended December 31, 2018 was 16.0%, compared to 0.8% in 2017. The 2018 effective tax rate included the effects of the benefit from the tax planning strategy, whereas the 2017 effective tax rate included the aforementioned impacts resulting from the 2017 Tax Act. For further discussion, see Note 9 – Income Taxes to the accompanying consolidated financial statements.

Income from continuing operations

Income from continuing operations was \$93.7 million for the year ended December 31, 2018, compared with \$60.5 million in the prior year, largely due to the improved operating income and the absence of \$6.1 million in pension settlement charges incurred in the prior year, partially offset by the \$17.4 million increase in income tax expense, the \$2.0 million increase in interest expense and the \$1.4 million reduction in other income.

Gain from discontinued operations and disposal, net of tax

In the year ended December 31, 2018, the Company recorded a net gain from discontinued operations and disposal of \$0.3 million, primarily due to adjustments of estimated product liability obligations of previously discontinued businesses, resulting from updated actuarial valuations.

In the year ended December 31, 2017, the Company recorded a net gain from discontinued operations and disposal of \$1.1 million, primarily due to an adjustment of foreign tax credits associated with the sale of the Fire Rescue Group and adjustments of estimated product liability obligations of previously discontinued businesses, resulting from updated actuarial valuations.

For further discussion of the gain from discontinued operations and disposals, see Note 18 – Discontinued Operations to the accompanying consolidated financial statements.

Year ended December 31, 2017 vs. year ended December 31, 2016**Net sales**

Net sales increased by \$190.6 million, or 27%, for the year ended December 31, 2017, compared to the prior year. Within the Environmental Solutions Group, net sales increased by \$201.9 million, or 41%, largely due to the addition of \$109.4 million of net sales from the TBEI acquisition, approximately \$54.7 million of incremental net sales resulting from the JJE acquisition, including increases in rental income and sales of used equipment, and improved domestic sales of sewer cleaners and vacuum trucks. In the Safety and Security Systems Group, net sales decreased by \$11.3 million, or 5%, primarily due to lower sales into global public safety markets and decreased sales of outdoor warning systems.

Cost of sales

For the year ended December 31, 2017, cost of sales increased by \$152.8 million, or 29%, compared to the prior year, largely due to an increase of \$162.4 million, or 42%, within the Environmental Solutions Group, primarily driven by increased sales volumes, additional cost of sales from the TBEI acquisition and the effects of a full year of JJE activity in 2017 compared with seven months in 2016, recognition of approximately \$0.8 million more expense associated with purchase accounting effects and a \$6.5 million increase in depreciation expense, largely resulting from depreciation on rental equipment acquired in the JJE transaction. This increase was partially offset by a decrease in cost of sales of \$9.6 million, or 7%, within the Safety and Security Systems Group, largely driven by lower sales volumes and the impact of material and labor cost reduction initiatives.

Gross profit

For the year ended December 31, 2017, gross profit increased by \$37.8 million, or 21%, compared to the prior year, primarily due to a \$39.5 million improvement in the Environmental Solutions Group, partially offset by a \$1.7 million reduction within the Safety and Security Systems Group. Gross margin for the year ended December 31, 2017 was 24.6%, compared to 25.9% in the prior year, largely due to incremental depreciation expense and purchase accounting expense effects, partially offset by gross margin improvement within the Safety and Security Systems Group related to the savings associated with material and labor cost reduction initiatives.

Table of Contents

Selling, engineering, general and administrative expenses

For the year ended December 31, 2017, SEG&A expenses increased by \$24.8 million, or 21%, primarily represented by a \$21.1 million increase within the Environmental Solutions Group, largely the result of the addition of expenses of businesses acquired, a \$4.7 million increase in amortization expense and strategic investments in our sales force to support our organic growth initiatives. SEG&A expenses with the Safety and Security Systems Group increased by \$0.3 million in comparison to the prior year, while Corporate SEG&A expenses increased by \$3.4 million, primarily driven by the recognition of \$0.7 million in executive severance costs, increased legal expenses associated with hearing loss litigation and higher employee incentive compensation costs.

Operating income

Operating income for the year ended December 31, 2017 increased by \$12.8 million, or 21%, to \$73.6 million, primarily driven by a \$17.9 million operating income improvement within the Environmental Solutions Group, associated with increased sales volumes, a \$6.2 million operating income contribution from TBEI and the effects of including a full year of operating income from JJE in 2017, compared to only seven months in 2016. TBEI's operating income contribution in 2017 included the effects of amortization expense on intangible assets acquired, which, coupled with the increased JJE activity, contributed to an increase in the Environmental Solutions Group's depreciation and amortization expense of \$11.2 million. In addition, there was a \$0.8 million increase in purchase accounting expense effects and a \$0.5 million increase in acquisition-related costs in 2017. Within the Safety and Security Systems Group, operating income in the year ended December 31, 2017 decreased by \$0.9 million, with the \$1.7 million decrease in gross profit and \$0.3 million increase in SEG&A expenses being partially offset by a \$1.1 million reduction in restructuring charges. In addition to the \$3.4 million increase in SEG&A expenses, corporate expenses in the year ended December 31, 2017 also included a \$0.8 million increase in acquisition-related expenses. Consolidated operating margin for the year ended December 31, 2017, inclusive of the incremental depreciation and amortization, purchase accounting expense effects, hearing loss settlement charges and acquisition costs, was 8.2%, compared to 8.6% in the prior year.

Interest expense

Interest expense for the year ended December 31, 2017 increased by \$5.4 million compared to the prior year, largely due to higher average debt levels following the acquisition of TBEI.

Pension settlement charges

During the year ended December 31, 2017, the Company announced a limited-time voluntary lump-sum pension offering to eligible, terminated, vested participants of its U.S. defined benefit plan, paying a total of \$13.7 million in lump-sum benefit payments to individuals that elected to receive a lump-sum settlement payment, using assets of the plan. As total benefit payments during the year ended December 31, 2017 exceeded the sum of the service and interest cost, the Company was required to measure the liabilities of the benefit plans and recognize a pension settlement charge of \$6.1 million. For further discussion, see Note 10 – Pensions to the accompanying consolidated financial statements.

Other (income) expense, net

For the year ended December 31, 2017, Other (income) expense, net, totaled \$0.8 million of income, largely due to foreign currency transaction gains, partially offset by \$0.4 million of net periodic pension expense. For the year ended December 31, 2016, \$1.8 million of expense was reported, largely related to \$3.1 million of net periodic pension expense, partially offset by a gain on the settlement of a foreign currency forward contract and interest income on a loan provided to a customer.

Income tax expense

The Company recognized income tax expense of \$0.5 million for the year ended December 31, 2017, compared to \$17.4 million for the year ended December 31, 2016. The decrease in expense was primarily due to the recognition of a \$23.0 million net tax benefit associated with the revaluation of the Company's net deferred tax liabilities in the U.S. following the reduction of the federal corporate tax rate included in the 2017 Tax Act, partially offset by a \$2.2 million net increase in valuation allowance, inclusive of a \$3.0 million valuation allowance recorded against the

Company's foreign tax credits as a result of the enactment of the 2017 Tax Act, the recognition of \$0.6 million of additional tax expense associated with a change in the state tax rate in Illinois, and additional taxes resulting from higher pre-tax earnings. The Company's effective tax rate for the year ended December 31, 2017 was 0.8%, compared to 30.6% in 2016. The 2017 effective tax rate included the aforementioned impacts resulting from the 2017 Tax Act. The effective tax rate for 2016 included a \$2.2 million net benefit from Canadian and U.K. valuation allowance changes.

Table of Contents

Income from continuing operations

Income from continuing operations was \$60.5 million for the year ended December 31, 2017, compared with \$39.4 million in the prior year, largely due to the improved operating income, the \$16.9 million reduction in income tax expense, the \$2.6 million increase in other income and the absence of \$0.3 million in debt settlement charges, partially offset by the \$5.4 million increase in interest expense, associated with higher average debt levels following the acquisition of TBEI and the \$6.1 million pension settlement charge.

Gain from discontinued operations and disposal, net of tax

For the year ended December 31, 2017, the Company recorded a net gain from discontinued operations and disposal of \$1.1 million, primarily due to an adjustment of foreign tax credits associated with the sale of the Fire Rescue Group and adjustments of estimated product liability obligations of previously discontinued businesses, resulting from updated actuarial valuations.

For the year ended December 31, 2016, the Company recorded a net gain from discontinued operations and disposal of \$4.4 million, primarily driven by the \$4.2 million net gain on disposal of the Fire Rescue Group, which was discontinued in 2015, partially offset by the \$0.6 million net loss that the Fire Rescue Group realized in its 2016 operations up to the January 29, 2016 sale completion date. The net gain on disposal includes a \$1.3 million charge to recognize a liability in connection with a Latvian commercial dispute. Also contributing to the net gain in 2016 was a reduction in uncertain tax position reserves of approximately \$1.0 million, as well as adjustments of estimated product liability obligations of previously discontinued businesses, resulting from updated actuarial valuations.

Orders & Backlog

(\$ in millions)	2018	2017	2016
Total orders	\$1,173.2	\$1,018.0	\$674.4
Change in orders year-over-year	15.2	% 50.9	% (1.7) %
Change in U.S. municipal and government orders year-over-year	3.5	% 18.3	% (5.8) %
Change in U.S. industrial and commercial orders year-over-year	28.5	% 139.6	% 0.3 %
Change in non-U.S. orders year-over-year	8.4	% 21.2	% 3.5 %
Backlog	\$337.7	\$257.5	\$137.0
Change in backlog year-over-year	31.1	% 88.0	% (20.0) %

On the date of acquisition, JJE had a backlog of orders from its end customers of \$43.3 million. These acquired orders were included in total orders reported for the year ended December 31, 2016.

On the date of acquisition, TBEI had a backlog of orders from its end customers of \$44.8 million. These acquired orders were included in total orders reported for the year ended December 31, 2017.

Year ended December 31, 2018 vs. year ended December 31, 2017

Total orders for the year ended December 31, 2018 were \$1,173.2 million, an increase of \$155.2 million, or 15%, compared to the prior year. The Environmental Solutions Group reported total orders of \$945.8 million in 2018, an increase of \$139.5 million, or 17%, compared to the prior year. The improvement was driven by incremental orders of \$66.2 million related to the inclusion of TBEI orders for a full year in 2018 versus seven months in 2017, and organic order growth of approximately \$73.3 million, or 11%. The organic growth was largely the result of improved orders for vacuum trucks, sewer cleaners, street sweepers and waterblasting equipment, as well as higher aftermarket demand, representing increased orders for parts, service, used and rental equipment. These improvements were partially offset by a reduction in refuse truck orders. Within the Safety and Security Systems Group, orders increased by \$15.7 million compared to the prior year, primarily driven by a \$14.9 million improvement in global orders for public safety products.

U.S. municipal and governmental orders increased by \$12.2 million, or 3%, primarily due to a \$14.8 million improvement within the Environmental Solutions Group, primarily driven by a \$13.1 million improvement in orders for sewer cleaners and higher aftermarket demand. This improvement was partially offset by a \$2.6 million reduction in municipal orders within the Safety and Security Systems Group, driven by a decrease in orders for outdoor warning systems of \$6.8 million, partially offset by an increase in orders for public safety products of \$4.2 million.

U.S. industrial and commercial orders increased by \$123.5 million, or 29%, largely driven by a \$116.9 million increase within the Environmental Solutions Group, primarily related to a \$48.3 million improvement in orders for vacuum trucks and an incremental \$67.0 million of orders from a full year of TBEI activity in 2018. In addition, aftermarket orders increased by \$4.8

Table of Contents

million. These increases were partially offset by a \$3.5 million reduction in street sweeper orders. Within the Safety and Security Systems Group, industrial orders increased by \$6.6 million due to increases in orders for outdoor warning systems, industrial products and public safety products of \$3.8 million, \$1.6 million and \$1.2 million, respectively.

Non-U.S. orders increased by \$19.5 million, or 8%, largely due to a \$7.8 million increase within the Environmental Solutions Group, primarily due to improvements in orders for vacuum trucks, sewer cleaners, street sweepers, and waterblasting equipment of \$11.3 million, \$6.8 million, \$4.4 million and \$2.1 million, respectively. In addition, aftermarket orders improved by \$7.3 million. Partially offsetting these improvements was a \$23.0 million decrease in refuse truck orders. Orders within the Safety and Security Systems Group increased by \$11.7 million, largely due to a \$9.5 million increase in orders for public safety products.

Year ended December 31, 2017 vs. year ended December 31, 2016

Total orders for the year ended December 31, 2017 were \$1,018.0 million, an increase of \$343.6 million, or 51%, compared to the prior year. The Environmental Solutions Group reported total orders of \$806.3 million in 2017, an increase of \$331.5 million, or 70%, compared to the prior year. The improvement was driven by organic order growth of approximately \$121.1 million, or 33%, primarily represented by improved orders for sewer cleaners, street sweepers and vacuum trucks, the effects of the TBEI acquisition, which added \$151.9 million in orders, and a net increase in orders of \$58.5 million related to the inclusion of JJE orders for a full year in 2017 versus seven months in 2016. Within the Safety and Security Systems Group, orders increased by \$12.1 million compared to the prior year, primarily driven by improvements in orders of industrial products, public safety products and outdoor warning systems.

U.S. municipal and governmental orders increased by \$55.8 million, or 18%, primarily due to a \$56.0 million improvement within the Environmental Solutions Group, largely represented by increases in orders for street sweepers and sewer cleaners of \$24.0 million and \$20.4 million, respectively, and a \$13.9 million increase in orders for dump truck bodies following the acquisition of TBEI. This improvement was partially offset by a \$0.2 million reduction in municipal orders within the Safety and Security Systems Group.

U.S. industrial and commercial orders increased by \$247.0 million, or 140%, largely driven by a \$239.9 million increase within the Environmental Solutions Group, primarily related to improvements in orders for vacuum trucks and sewer cleaners of \$50.4 million and \$29.2 million, respectively, the acquisition of TBEI, which contributed \$138.0 million, and the effects of the inclusion of JJE orders for a full year in 2017 versus seven months in 2016. Within the Safety and Security Systems Group, industrial orders were up \$7.1 million, due to increased orders of outdoor warning systems, public safety products and industrial products of \$4.0 million, \$2.5 million and \$0.6 million, respectively.

Non-U.S. orders increased by \$40.8 million, or 21%, largely due to a \$35.6 million increase within the Environmental Solutions Group, reflecting increased Canadian orders following the acquisition of JJE in June of 2016. Orders within the Safety and Security Systems Group increased by \$5.2 million, driven by improved orders in industrial and coal markets, partially offset by reduced orders from international public safety markets.

Backlog

Backlog was \$337.7 million at December 31, 2018 as compared to \$257.5 million at December 31, 2017. The increase of \$80.2 million, or 31%, was primarily due to a \$79.2 million increase in backlog within the Environmental Solutions Group, largely due to higher demand for vacuum trucks, sewer cleaners and street sweepers in the U.S. In addition, backlog within the Safety and Security Systems Group improved by \$1.0 million, primarily due to increased orders for public safety products.

Table of Contents

Environmental Solutions

The following table summarizes the Environmental Solutions Group's operating results as of and for the years ended December 31, 2018, 2017 and 2016:

(\$ in millions)	For the Years Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Net sales	\$863.5	\$692.6	\$490.7	\$170.9	\$201.9
Operating income	113.0	72.4	54.5	40.6	17.9
Other data:					
Operating margin	13.1	% 10.5	% 11.1	% 2.6	% (0.6)%
Total orders	\$945.8	\$806.3	\$474.8	\$139.5	\$331.5
Backlog	310.3	231.1	116.6	79.2	114.5
Depreciation and amortization	32.6	25.7	14.5	6.9	11.2

Year ended December 31, 2018 vs. year ended December 31, 2017

Total orders increased by \$139.5 million, or 17%, for the year ended December 31, 2018. U.S. orders increased by \$131.7 million, largely due to the prior year acquisition of TBEI, which contributed an increase in orders of \$64.4 million in a full-year in 2018. The organic growth in the U.S. of \$67.3 million was largely driven by improvements in orders for vacuum trucks and sewer cleaners of \$49.6 million and \$12.4 million, respectively. In addition, aftermarket demand, representing orders for parts, service, used and rental equipment, improved by \$9.3 million. Non-U.S. orders increased by \$7.8 million, primarily due to improvements in orders for vacuum trucks, sewer cleaners, street sweepers, and waterblasting equipment of \$11.3 million, \$6.8 million, \$4.4 million and \$2.1 million, respectively. In addition, aftermarket orders improved by \$7.3 million. Partially offsetting these improvements was a \$23.0 million decrease in refuse truck orders.

Net sales increased by \$170.9 million, or 25%, for the year ended December 31, 2018. U.S. sales increased by \$167.4 million, or 31%, primarily due to the inclusion of five more months of TBEI results in the current year, accounting for \$97.0 million of the sales increase, as well as increases in shipments of vacuum trucks and sewer cleaners of \$37.9 million and \$28.8 million, respectively. In addition, aftermarket revenues improved by \$3.4 million, primarily represented by increased parts and service revenues and rental income. Non-U.S. sales increased by \$3.5 million, or 2%, primarily due to a \$12.4 million improvement in aftermarket revenue, represented by higher parts and service revenues, rental income and used equipment sales, as well as a \$6.6 million increase in vacuum truck shipments. The acquisition of TBEI also contributed \$1.1 million of incremental sales. Partially offsetting these improvements was a \$16.1 million reduction in sales of products manufactured by other companies, such as refuse trucks.

Cost of sales increased by \$117.1 million, or 21%, for the year ended December 31, 2018, primarily attributable to increased sales volumes, the effects of a full year of TBEI activity in the current year compared with seven months in the prior year, higher material costs and a \$3.7 million increase in depreciation expense, partially offset by a \$3.7 million reduction in purchase accounting expenses. Gross margin increased to 22.9% from 20.8% in the prior-year period, primarily due to improved operating leverage, benefits from pricing actions taken in response to higher commodity costs, favorable sales mix and the reduction in purchase accounting expenses, partially offset by the higher depreciation expense.

SEG&A expenses increased by \$13.2 million, or 19%, for the year ended December 31, 2018, largely due to the addition of expenses associated with the TBEI acquisition, including an increase in amortization expense of \$3.2 million. As a percentage of net sales, SEG&A expenses decreased from 10.2% in the prior year, to 9.7% in the current year.

Operating income for the year ended December 31, 2018 increased by \$40.6 million, or 56%, largely due to the \$53.8 million increase in gross profit, partially offset by the \$13.2 million increase in SEG&A expenses.

Backlog was \$310.3 million at December 31, 2018, up 34% compared to \$231.1 million at December 31, 2017. The increase is primarily due to the effects of improved demand for vacuum trucks, sewer cleaners and street sweepers in the U.S.

Year ended December 31, 2017 vs. year ended December 31, 2016

Total orders increased by \$331.5 million, or 70%, for the year ended December 31, 2017. U.S. orders increased by \$295.9 million, largely due to improvements in orders for sewer cleaners, vacuum trucks and street sweepers of \$49.7 million, \$43.1 million and \$32.5 million, respectively, as well as the impact of the TBEI acquisition, which contributed \$151.9 million of orders. Street sweeper and sewer cleaner order improvements were primarily driven by increased demand within municipal and industrial markets, while the increase in vacuum truck orders was associated with improved conditions in industrial markets in

Table of Contents

comparison to the prior year, when there was a higher amount of used equipment in some of our end markets. The improvement in vacuum truck orders was also reflective of our strategic initiative to expand into the utility market, and the replenishment of customer rental fleets. Non-U.S. orders increased by \$35.6 million, primarily attributed to the acquisition of JJE, completed in June 2016.

Net sales increased by \$201.9 million, or 41%, for the year ended December 31, 2017. U.S. sales increased by \$166.7 million, or 45%, primarily due to the 2017 acquisition of TBEI which contributed \$109.0 million of sales, and increases in shipments of vacuum trucks, sewer cleaners and waterblasting equipment of \$21.1 million, \$10.7 million and \$3.9 million, respectively. In addition, rental income and sales of used equipment improved by \$5.5 million and \$7.5 million, respectively, largely due to 2017 including a full year of JJE activity compared with seven months in 2016. Partially offsetting these improvements was a \$2.0 million decrease in street sweeper sales. Non-U.S. sales increased by \$35.2 million, or 30%, primarily due to the effects of the additional JJE activity in 2017, including increases in rental income and sales of used equipment of \$7.6 million and \$1.8 million, respectively.

Cost of sales increased by \$162.4 million, or 42%, for the year ended December 31, 2017, primarily attributable to higher sales volumes, additional cost of sales from the TBEI acquisition and the effects of a full year of JJE activity in 2017, recognition of approximately \$0.8 million more expense associated with purchase accounting effects and a \$6.5 million increase in depreciation expense, largely resulting from depreciation on rental equipment acquired in the JJE transaction. Gross margin decreased to 20.8% from 21.3% in the prior year, largely due to the aforementioned incremental depreciation and purchase accounting expense effects.

SEG&A expenses increased by \$21.1 million, or 43%, for the year ended December 31, 2017, largely due to the addition of expenses of businesses acquired, a \$4.7 million increase in amortization expense and strategic investments in our sales force to support our organic growth initiatives.

Operating income for the year ended December 31, 2017 increased by \$17.9 million, or 33%, largely due to the \$39.5 million increase in gross profit, partially offset by the \$21.1 million increase in SEG&A expenses and a \$0.5 million increase in acquisition and integration-related expenses.

Backlog was \$231.1 million at December 31, 2017, up 98% compared to \$116.6 million at December 31, 2016. The increase is primarily due to the contribution of \$42.5 million of backlog from TBEI, as well as the effects of improved demand for sewer cleaners, vacuum trucks, and street sweepers in the U.S.

Safety and Security Systems

The following table summarizes the Safety and Security Systems Group's operating results as of and for the years ended December 31, 2018, 2017 and 2016:

(\$ in millions)	For the Years Ended December 31,			Change	
	2018	2017	2016	2018 vs. 2017	2017 vs. 2016
Net sales	\$226.0	\$205.9	\$217.2	\$20.1	\$(11.3)
Operating income	34.1	27.0	27.9	7.1	(0.9)
Other data:					
Operating margin	15.1	% 13.1	% 12.8	% 2.0	% 0.3
Total orders	\$227.4	\$211.7	\$199.6	\$15.7	\$12.1
Backlog	27.4	26.4	20.4	1.0	6.0
Depreciation and amortization	3.7	4.1	4.4	(0.4)	(0.3)

Year ended December 31, 2018 vs. year ended December 31, 2017

Total orders increased by \$15.7 million or 7%, for the year ended December 31, 2018. In the aggregate, U.S. orders increased by \$4.0 million, or 3%, compared to the prior year, driven by increases in orders for public safety products and industrial products of \$5.4 million and \$1.6 million, respectively. These increases were partially offset by a \$3.0 million reduction in orders for outdoor warning systems. Non-U.S. orders increased by \$11.7 million, or 16%, largely

due to a \$9.5 million increase in orders for public safety products, a \$2.1 million favorable foreign currency translation impact, and a \$0.6 million increase in orders for outdoor warnings systems, partially offset by a \$0.5 million reduction in orders for industrial products.

Net sales increased by \$20.1 million, or 10%, for the year ended December 31, 2018. U.S. sales increased by approximately \$5.8 million, primarily due to increases in sales of public safety and industrial products of \$8.1 million and \$0.4 million, respectively. Partially offsetting these increases was a \$2.7 million reduction in sales of outdoor warning products. Non-U.S.

Table of Contents

sales increased by \$14.3 million, primarily driven by increases in sales of public safety products and outdoor warning systems of \$7.5 million and \$5.1 million, respectively, as well as a \$1.7 million favorable foreign currency translation impact.

Cost of sales increased by \$13.0 million, or 10%, for the year ended December 31, 2018, largely due to higher sales volumes and an unfavorable foreign currency translation impact of \$1.3 million. Gross margin for the year ended December 31, 2018 was 37.3%, compared to 37.5% in the prior year.

SEG&A expenses for the year ended December 31, 2018 were \$0.6 million, or 1%, higher than the prior year, primarily due to increased expenses associated with new product development and other growth initiatives. As a percentage of net sales, SEG&A expenses decreased from 24.1% in the prior year, to 22.2% in the current year.

Operating income for the year ended December 31, 2018 increased by \$7.1 million, or 26%, largely due to the \$7.1 million increase in gross profit and a \$0.6 million reduction in restructuring charges, partially offset by the \$0.6 million increase in SEG&A expenses.

Backlog was \$27.4 million at December 31, 2018 compared to \$26.4 million at December 31, 2017. The increase was primarily due to increased orders for public safety products.

Year ended December 31, 2017 vs. year ended December 31, 2016

Total orders increased by \$12.1 million or 6%, for the year ended December 31, 2017. In the aggregate, U.S. orders increased by \$6.9 million compared to the prior year, driven by increases in orders of outdoor warning systems, public safety products and industrial products of \$3.4 million, \$2.9 million and \$0.6 million, respectively. Non-US orders increased by \$5.2 million, largely due to a \$6.8 million increase in orders from international industrial markets, including oil and gas and coal markets, partially offset by a \$1.6 million decrease in orders of international public safety products.

Net sales decreased by \$11.3 million, or 5%, for the year ended December 31, 2017. U.S. sales decreased by approximately \$4.4 million, primarily due to decreased sales of public safety products and outdoor warning systems of \$3.0 million and \$3.3 million, respectively. The reduction in sales of both public safety products and outdoor warnings systems was primarily attributable to fewer large orders when compared to the prior year. Partially offsetting these decreases was a \$1.9 million improvement in sales of industrial products. Non-U.S. sales decreased by \$6.9 million, primarily driven by a \$5.8 million reduction in sales into international public safety markets and a \$2.4 million decrease in sales of outdoor warning systems. Partially offsetting these decreases was a \$1.3 million improvement in sales of industrial products into international industrial markets, including oil and gas and coal markets.

Cost of sales decreased by \$9.6 million, or 7%, for the year ended December 31, 2017, largely due to the effects of lower sales volumes, as well as the effects of material cost reduction initiatives implemented in 2017 and 2016. These actions contributed to an improved gross margin for the year ended December 31, 2017 of 37.5%, compared to 36.3% in the prior year.

SEG&A expenses for the year ended December 31, 2017 were \$0.3 million higher than the prior year, with additional expenses associated with strategic investments in support of new product development and other growth initiatives being partially offset by savings realized from prior year restructuring activities.

Operating income for the year ended December 31, 2017 decreased by \$0.9 million, with the \$1.7 million decrease in gross profit and \$0.3 million increase in SEG&A expenses being partially offset by a \$1.1 million reduction in restructuring charges.

Backlog was \$26.4 million at December 31, 2017 compared to \$20.4 million at December 31, 2016. The increase was primarily due to increased orders for outdoor warnings systems, as well as large police orders within public safety markets that were received in the fourth quarter of 2017.

Corporate Expense

Corporate operating expenses were \$25.6 million, \$25.8 million and \$21.6 million for the years ended December 31, 2018, 2017 and 2016, respectively.

For the year ended December 31, 2018, corporate operating expenses decreased by \$0.2 million, primarily driven by a \$1.2 million decrease in acquisition and integration-related expenses, reductions in hearing loss litigation and

post-employment expenses and the absence of \$0.7 million in executive severance costs, partially offset by higher employee incentive and stock compensation costs.

For the year ended December 31, 2017, corporate operating expenses increased by \$4.2 million, primarily driven by a \$0.8 million increase in acquisition and integration-related expenses associated with the TBEI acquisition, the recognition of \$0.7

25

Table of Contents

million in executive severance costs, increased legal expenses associated with hearing loss litigation and higher employee incentive compensation costs.

The Company's hearing loss litigation has historically been managed by the Company's legal staff resident at the corporate office and not by management at either segment. In accordance with Accounting Standards Codification ("ASC") 280, Segment Reporting, which provides that segment reporting should follow the management of the item and that certain expenses may be corporate expenses, these legal expenses (which are not part of the normal operating activities of any of our reportable segments) are reported and managed as corporate expenses.

Financial Condition, Liquidity and Capital Resources

The Company uses its cash flow from operations to fund growth and to make capital investments that sustain its operations, reduce costs, or both. Beyond these uses, remaining cash is used to pay down debt, repurchase shares, fund dividend payments and make pension contributions. The Company may also choose to invest in the acquisition of businesses. In the absence of significant unanticipated cash demands, we believe that the Company's existing cash balances, cash flow from operations and borrowings available under the Amended 2016 Credit Agreement will provide funds sufficient for these purposes. The net cash flows associated with the Company's rental equipment transactions are included in cash flow from operating activities. Subsequent to the acquisition of JJE, net cash flows from rental equipment transactions have become more significant, and as such, cash flow from operating activities may not be directly comparable with amounts reported in periods prior to the acquisition.

The Company's cash and cash equivalents totaled \$37.4 million, \$37.5 million and \$50.7 million as of December 31, 2018, 2017 and 2016, respectively. As of December 31, 2018, \$19.9 million of cash and cash equivalents was held by foreign subsidiaries. Cash and cash equivalents held by subsidiaries outside the U.S. typically are held in the currency of the country in which it is located. This cash is used to fund the operating activities of our foreign subsidiaries and for further investment in foreign operations. Historically, we considered such cash to be permanently reinvested in our foreign operations and our current plans do not demonstrate a need to repatriate such cash to fund U.S. operations. However, in the event that these funds were needed to fund U.S. operations or to satisfy U.S. obligations, they generally could be repatriated. The repatriation of these funds may have caused us to incur additional U.S. income tax expense, dependent on income tax laws and other circumstances at the time any such amounts were repatriated.

The 2017 Tax Act provided a one-time "transition tax" on untaxed post-1986 accumulated earnings and profits ("E&P") of a company's controlled foreign corporations ("CFC") determined as of November 2, 2017 or December 31, 2017 (whichever date on which there is more deferred E&P). As disclosed in Note 9 - Income Taxes, the Company's accumulated undistributed earnings of foreign subsidiaries aggregated to an overall E&P deficit. Therefore, the Company did not have a transition tax liability under the provisions of the 2017 Tax Act. As of December 31, 2018, the Company continues to assert that its undistributed earnings of certain foreign subsidiaries are indefinitely reinvested. The Company will continue to evaluate its U.S. and foreign cash needs and, as circumstances change, may change its assertion related to all or a portion of its undistributed foreign earnings.

Net cash provided by continuing operating activities totaled \$92.8 million, \$73.5 million and \$26.7 million in 2018, 2017 and 2016, respectively. The \$19.3 million, or 26%, increase in cash generated by continuing operating activities in 2018 compared to the prior year was primarily due to higher earnings and additional cash generated by TBEI in a full-year of activity this year compared to seven months in the prior year. These improvements were partially offset by increases in income tax payments and pension contributions of \$7.7 million and \$2.4 million, respectively, as well as higher incentive compensation payments in comparison to the prior year.

Net cash used for continuing investing activities totaled \$11.0 million, \$277.1 million and \$103.0 million in 2018, 2017 and 2016, respectively. In each of the years presented, cash was used to fund the purchase of properties and equipment, with \$14.1 million, \$8.0 million and \$6.1 million of capital expenditures in 2018, 2017 and 2016, respectively. As discussed in Note 3 - Acquisitions, in 2018, the Company received an adjustment for working capital and other post-closing items in the amount of \$3.0 million relating to the TBEI acquisition, which was completed in 2017 for an initial payment of \$269.2 million. In 2016, the Company paid \$96.6 million to acquire substantially all the assets and operations of JJE, and also used \$6.0 million to acquire Westech. In addition, during 2016, the Company

received \$6.0 million from a customer as full repayment of a loan that was originally provided in the fourth quarter of 2015. Net cash provided by discontinued investing activities totaled \$86.2 million in 2016, which represented the net proceeds from the sale of Bronto.

In 2018, net cash of \$81.2 million was used for continuing financing activities, while in 2017, net cash of \$190.7 million was provided by continuing financing activities. In 2018, the Company repaid \$62.1 million of borrowings under its revolving credit facility, funded cash dividends of \$18.7 million and repurchased \$1.2 million of treasury stock. In 2017, in connection with the funding of the acquisition of TBEI, the Company borrowed \$243.0 million against its revolving credit facility.

Table of Contents

Between the TBEI acquisition date and the end of 2017, approximately \$34 million of net borrowings were repaid. In addition, the Company funded cash dividends of \$16.8 million and redeemed \$2.9 million of stock in order to remit funds to tax authorities to satisfy employees' minimum tax withholdings following the vesting of stock-based compensation. In 2016, the Company borrowed \$64.8 million against its revolving credit facility, funded cash dividends of \$16.9 million, repurchased \$37.8 million of treasury stock, and redeemed \$2.7 million of stock in order to remit funds to tax authorities to satisfy employees' minimum tax withholdings following the vesting of stock-based compensation. The Company also paid the remaining \$43.4 million of term loan debt outstanding under the Company's March 13, 2013 Credit Agreement (the "2013 Credit Agreement") and spent \$1.1 million on fees in connection with its debt refinancing.

On January 27, 2016, the Company entered into an Amended and Restated Credit Agreement (the "2016 Credit Agreement"), by and among the Company and certain of its foreign subsidiaries (collectively, the "Borrowers"), Wells Fargo Bank, National Association, as administrative agent, swingline lender and issuing lender, JPMorgan Chase Bank, N.A. as syndication agent, KeyBank National Association, as documentation agent, Wells Fargo Securities, LLC and J.P. Morgan Securities LLC, as joint lead arrangers and joint bookrunners, and the other lenders and parties signatory thereto.

The 2016 Credit Agreement provided for a \$325.0 million revolving credit facility, maturing on January 27, 2021, with borrowings in the form of loans or letters of credit up to the aggregate availability under the facility, with a sub-limit of \$50.0 million for letters of credit.

On June 2, 2017, in anticipation of the TBEI acquisition, the Company executed an amendment to the 2016 Credit Agreement (as amended, the "Amended 2016 Credit Agreement"), which increased the borrowing capacity under the Amended 2016 Credit Agreement to \$400.0 million. In addition, the Amended 2016 Credit Agreement includes an accordion feature, whereby the Company may cause the commitments to increase by up to an additional \$75.0 million, subject to the approval of the applicable lenders providing such additional financing.

The Amended 2016 Credit Agreement allows for the Borrowers to borrow in denominations of U.S. Dollars, Canadian Dollars (up to a maximum of C\$100.0 million) or Euros (up to a maximum of €20.0 million). Borrowings under the Amended 2016 Credit Agreement may be used for working capital and general corporate purposes, including permitted acquisitions.

The Company's domestic subsidiaries provide guarantees for all obligations of the Borrowers under the Amended 2016 Credit Agreement, which is secured by a first priority security interest in all now or hereafter acquired domestic property and assets and the stock or other equity interests in each of the domestic subsidiaries and 65% of the outstanding voting capital stock of certain first-tier foreign subsidiaries, subject to certain exclusions.

Borrowings under the Amended 2016 Credit Agreement bear interest, at the Company's option, at a base rate or a LIBOR rate, plus, in each case, an applicable margin. The applicable margin ranges from 0.00% to 1.25% for base rate borrowings and 1.00% to 2.25% for LIBOR borrowings. The Company must also pay a commitment fee to the lenders ranging between 0.15% to 0.30% per annum on the unused portion of the \$400.0 million revolving credit facility along with other standard fees. Letter of credit fees are payable on outstanding letters of credit in an amount equal to the applicable LIBOR margin plus other customary fees.

The Company is subject to certain leverage ratio and interest coverage ratio financial covenants under the Amended 2016 Credit Agreement that are to be measured at each fiscal quarter-end. The Company was in compliance with all such covenants as of December 31, 2018. Although it has not been triggered by the Company, the Amended 2016 Credit Agreement also includes a "covenant holiday" period, which allows for the temporary increase of the minimum leverage ratio following the completion of a permitted acquisition, or a series of permitted acquisitions, when the total consideration exceeds a specified threshold. In addition, the Amended 2016 Credit Agreement includes customary negative covenants, subject to certain exceptions, restricting or limiting the Company's and its subsidiaries' ability to, among other things: (i) make non-ordinary course dispositions of assets, (ii) make certain fundamental business changes, such as merge, consolidate or enter into any similar combination, (iii) make restricted payments, including dividends and stock repurchases, (iv) incur indebtedness, (v) make certain loans and investments, (vi) create liens,

(vii) transact with affiliates, (viii) enter into sale/leaseback transactions, (ix) make negative pledges and (x) modify subordinated debt documents.

Under the Amended 2016 Credit Agreement, restricted payments, including dividends and stock repurchases, shall be permitted if (i) the Company's leverage ratio is less than or equal to 2.50, (ii) the Company is in compliance with all other financial covenants and (iii) there are no existing defaults under the Amended 2016 Credit Agreement. If its leverage ratio is more than 2.50, the Company is still permitted to fund (i) up to \$30.0 million of dividend payments, (ii) stock repurchases sufficient to offset dilution created by the issuance of equity as compensation to its officer, directors, employees and consultants and (iii) an incremental \$30.0 million of other cash payments.

Table of Contents

The Amended 2016 Credit Agreement contains customary events of default. If an event of default occurs and is continuing, the Borrowers may be required immediately to repay all amounts outstanding under the Amended 2016 Credit Agreement and the commitments from the lenders may be terminated.

In connection with its debt refinancing in the year ended December 31, 2016, the Company repaid the remaining \$43.4 million of principal outstanding under the 2013 Credit Agreement and wrote off approximately \$0.3 million of associated unamortized deferred financing fees. The Company incurred \$1.1 million of debt issuance costs in connection with the execution of the 2016 Credit Agreement. Such fees have been deferred and are being amortized over the five-year term.

As of December 31, 2018, there was \$209.4 million of cash drawn and \$11.3 million of undrawn letters of credit under the Amended 2016 Credit Agreement, with \$179.3 million of net availability for borrowings.

For the year ended December 31, 2018, gross payments and gross borrowings under the Amended 2016 Credit Agreement were \$70.1 million and \$8.0 million, respectively. For the year ended December 31, 2017, gross borrowings and gross payments under the 2016 Credit Agreement and the Amended 2016 Credit Agreement were \$262.7 million and \$53.6 million, respectively. For the year ended December 31, 2016, gross borrowings and gross payments under the 2016 Credit Agreement were \$69.8 million and \$5.0 million, respectively.

Aggregate maturities of total borrowings due amount to approximately \$0.2 million in 2019, \$0.2 million in 2020, \$209.6 million in 2021 and \$0.1 million in 2022. The weighted average interest rate on long-term borrowings was 3.3% at December 31, 2018.

The Company paid interest of \$8.7 million in 2018, \$6.6 million in 2017 and \$1.1 million in 2016.

The Company paid income taxes of \$21.6 million in 2018, \$13.9 million in 2017 and \$13.3 million in 2016.

Cash dividends of \$18.7 million, \$16.8 million and \$16.9 million were declared and paid to stockholders in 2018, 2017 and 2016, respectively.

The Company recently announced plans to expand the primary production facility of its Vactor Manufacturing, Inc. subsidiary. Over the course of the expansion project, the Company is expecting to invest up to \$25 million. The Company anticipates that capital expenditures for 2019, excluding investment associated with the Vactor plant expansion, will be in the range of \$15 million to \$20 million. The Company believes that its financial resources and major sources of liquidity, including cash flow from operations and borrowing capacity, will be adequate to meet its operating needs, capital needs and financial commitments.

Contractual Obligations and Off-Balance Sheet Arrangements

The following table summarizes the Company's contractual obligations and payments due by period as of December 31, 2018:

(in millions)	Payments Due by Period				
	Total	Less than 1 Year	2-3 Years	4-5 Years	More than 5 Years
Long-term debt	\$209.4	\$ —	\$ 209.4	\$ —	\$ —
Interest payments on long-term debt ^(a)	13.6	6.8	6.8	—	—
Operating lease obligations	34.3	8.9	14.9	9.3	1.2
Capital lease obligations	0.7	0.2	0.4	0.1	—
Purchase obligations ^(b)	115.0	112.4	2.6	—	—
Pension contributions ^(c)	1.3	1.3	—	—	—
Contingent earn-out payment and deferred payment ^(d)	12.4	12.4	—	—	—
Total contractual obligations ^(e)	\$386.7	\$ 142.0	\$ 234.1	\$ 9.4	\$ 1.2

(a) Amounts represent estimated contractual interest payments on outstanding long-term debt.

(b) Purchase obligations primarily relate to commercial chassis and other contracts in the ordinary course of business.

(c) The Company expects to contribute up to \$1.3 million to the non-U.S. benefit plan in 2019, which represents the minimum required contribution. The Company does not currently expect to make any contributions to the U.S. benefit plan in 2019. Future contributions to the plans will be based on such factors as (i) annual service cost, (ii)

the financial return on plan assets, (iii) interest rate movements that affect discount rates applied to plan liabilities and (iv) the value of benefit payments made. Due to the high degree of uncertainty regarding the potential future cash outflows associated with these plans, the Company is unable to provide a reasonably reliable estimate of the amounts and periods in which any additional liabilities might be paid.

- (d) Represents the fair value of the contingent earn-out payment and deferred payment associated with the acquisition of JJE. For further discussion, see Note 3 – Acquisitions to the accompanying consolidated financial statements.

Table of Contents

As of December 31, 2018, the Company had a liability of approximately \$1.6 million for unrecognized tax benefits. For further discussion, see Note 9 – Income Taxes to the accompanying consolidated financial statements.

- (e) Due to the uncertainties related to these tax matters, the Company generally cannot make a reasonably reliable estimate of the period of cash settlement for this liability. As such, the potential future cash outflows are not included in the table above. We do not expect any significant change to our unrecognized tax benefits as a result of potential expiration of statute of limitations and settlements with tax authorities.

The following table summarizes the Company’s off-balance sheet arrangements and the notional amount by expiration period as of December 31, 2018:

(in millions)	Notional Amount by Expiration Period			
	Total	Less than 1 Year	2-3 Years	4-5 Years
Financial standby letters of credit ^(a)	\$ 10.7	\$ 10.7	\$ —	\$ —
Performance standby letters of credit ^(a)	0.6	0.6	—	—
Performance and bid bonds ^(b)	6.9	6.8	0.1	—
Repurchase obligations ^(c)	4.3	3.5	0.8	—
Total off-balance sheet arrangements	\$ 22.5	\$ 21.6	\$ 0.9	\$ —

- (a) Financial standby letters of credit largely relate to casualty insurance policies for the Company’s workers’ compensation, automobile, general liability and product liability policies. Performance standby letters of credit primarily represent guarantees of performance of certain subsidiaries that engage in transactions with foreign customers.

- (b) Performance and bid bonds primarily relate to guarantees of performance of certain subsidiaries that engage in transactions with domestic and foreign customers.

- (c) Relates to certain transactions that the Company has entered into involving the sale of equipment to certain of its customers which included (i) guarantees to repurchase the equipment for a fixed price at a future date and (ii) guarantees to repurchase the equipment from the third-party lender in the event of default by the customer. For further discussion, see Note 11 – Commitments and Contingencies to the accompanying consolidated financial statements.

Critical Accounting Policies and Estimates

The preparation of consolidated financial statements in conformity with U.S. generally accepted accounting principles (“GAAP”) requires management to make estimates and assumptions that affect (i) the reported amounts of assets and liabilities, (ii) disclosure of contingent assets and liabilities at the date of the consolidated financial statements and (iii) the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates. The Company considers the following policies to be the most critical in understanding the judgments that are involved in the preparation of the Company’s consolidated financial statements and the uncertainties that could impact the Company’s financial condition, results of operations or cash flow.

Goodwill

Goodwill represents the excess of the cost of an acquired business over the amounts assigned to its net assets. Goodwill is not amortized but is tested for impairment at a reporting unit level on an annual basis or more frequently if indicators of impairment exist. The Company performed its annual goodwill impairment test as of October 31, 2018.

Effective January 1, 2018, the Company adopted ASU No. 2017-04, Intangibles – Goodwill and Other (Topic 350), Simplifying the Test for Goodwill Impairment, which eliminated the second step of the two-step quantitative approach for testing goodwill for potential impairment. Under ASU 2017-04, an entity performs the goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount, and recognizes an impairment charge for the amount by which the carrying amount exceeds the fair value, not to exceed the total amount of goodwill allocated to the reporting unit. An entity still has the option to perform a qualitative assessment to determine if the quantitative impairment test is necessary. The Company applied the guidance in ASU 2017-04 to its 2018 annual goodwill

impairment test. See Note 1 - Summary of Significant Accounting Policies for further discussion regarding the Company's adoption of this new accounting pronouncement.

A qualitative approach is applied when the Company concludes that it is not "more likely than not" that the fair value of a reporting unit is less than its carrying value. In this situation, the Company would not be required to perform the quantitative impairment test described below. Management applied the qualitative approach to assess the goodwill of its reporting units for potential impairment in 2018 and 2017 and concluded that it was not "more likely than not" that the fair value of the Company's reporting units were less than their carrying values.

As previously described, the quantitative approach is used to identify potential impairment by comparing the fair value of a reporting unit with its carrying amount, including goodwill. If the fair value of a reporting unit exceeds its carrying amount, goodwill of the reporting unit is not impaired and no impairment charge is required. If the carrying amount of a reporting unit exceeds its fair value, this difference is recorded as an impairment charge not to exceed the carrying amount of goodwill. The

Table of Contents

Company generally determines the fair value of its reporting units using two valuation methods: the “Income Approach — Discounted Cash Flow Analysis” method, and the “Market Approach — Guideline Public Company Method.” Under the “Income Approach — Discounted Cash Flow Analysis” method, the key assumptions consider projected sales, cost of sales and operating expenses. These assumptions are determined by management utilizing our internal operating plan, including growth rates for revenues and operating expenses and margin assumptions. An additional key assumption under this approach is the discount rate, which is determined by reviewing current risk-free rates of capital and current market interest rates and by evaluating the risk premium relevant to the business segment. If our assumptions relative to growth rates were to change, our fair value calculation may change, which could result in impairment.

Under the “Market Approach — Guideline Public Company Method,” the Company identifies several publicly traded companies, which we believe have sufficiently relevant similarities to our businesses. For these companies, the Company uses market values to calculate the mean ratio of invested capital to revenues and invested capital to EBITDA. Similar to the income approach discussed above, sales, cost of sales, operating expenses and their respective growth rates are key assumptions utilized. The market prices of the Company’s common stock and other guideline companies are additional key inputs. If these market prices increase, the estimated market value would increase. Conversely, if market prices decrease, the estimated market value would decrease.

The results of these two methods are weighted based upon management’s evaluation of the relevance of the two approaches.

Although the Company believes its estimates of fair value are reasonable, actual financial results could differ from estimated financial results due to the inherent uncertainty involved in making such estimates. Changes in assumptions concerning future financial results or other underlying assumptions could have a significant impact on either the fair value of the reporting units, the amount of any goodwill impairment charge, or both. Future declines in the overall market value of the Company may also result in a conclusion that the fair value of one or more reporting units has declined below its carrying value.

One measure of the sensitivity of assumptions used in the impairment analysis is the amount by which each reporting unit “passed” (fair value exceeds the carrying value). The fair value of the reporting units that were tested for impairment under the first-step of the former two-step approach in the most recent quantitative analysis performed in 2016 significantly exceeded their carrying values. Relatively small changes in the Company’s key assumptions would not have resulted in any of these reporting units failing the two-step test.

The Company had no goodwill impairments in 2018, 2017 or 2016. Adverse changes to the Company’s business environment and future cash flow could cause us to record impairment charges in future periods, which could be material. See Note 7 – Goodwill and Other Intangible Assets to the accompanying consolidated financial statements for a summary of the Company’s goodwill by segment.

Indefinite-lived Intangible Assets

An intangible asset determined to have an indefinite useful life is not amortized. Indefinite-lived intangible assets are tested for impairment on an annual basis at year-end, or more frequently if an event occurs or circumstances change that indicate the fair value of an indefinite-lived intangible asset could be below its carrying amount. The Company’s indefinite-lived intangible assets include trade names associated primarily with the TBEI and JJE acquisitions that were completed in 2017 and 2016, respectively.

In testing the indefinite-lived intangibles assets for potential impairment, the Company applies either a qualitative test, or a quantitative test, in accordance with ASC 350, Intangibles — Goodwill and Other. A qualitative approach is applied when the Company concludes that it is not “more likely than not” that the fair value of the indefinite-lived intangibles are less than their carrying value. A quantitative impairment test consists of comparing the fair value of the indefinite-lived intangible asset with its carrying amount. An impairment loss would be recognized for the carrying amount in excess of its fair value. In 2018, 2017 and 2016, the Company applied a qualitative approach. Based on the proximity of the relevant acquisition dates to the annual impairment test dates and the post-acquisition performance of the businesses compared to the related valuation assumptions, the Company concluded that it was not “more likely than

not” that the fair value of indefinite-lived intangible assets were less than the carrying amounts.

Significant judgment is applied when evaluating whether an intangible asset has an indefinite useful life. In addition, for indefinite-lived intangible assets, significant judgment is applied in testing for impairment. This judgment includes developing cash flow projections, selecting appropriate discount rates, identifying relevant market comparables, and incorporating general economic and market conditions.

The Company had no indefinite-lived intangible asset impairments in 2018, 2017 or 2016. Although the Company believes its estimates of fair value are reasonable, actual financial results could differ from estimated financial results due to the inherent

Table of Contents

uncertainty involved in making such estimates. The use of alternative estimates and assumptions could increase or decrease the estimated fair value of the assets and potentially result in different impacts to the Company's results of operations. Actual results may differ from the Company's estimates.

See Note 7 – Goodwill and Other Intangible Assets to the accompanying consolidated financial statements for a summary of the Company's indefinite-lived intangible assets.

Revenue Recognition

Revenue is recognized when performance obligations under the terms of a contract with the customer are satisfied; generally this occurs at a point in time, with the transfer of control of the Company's products or services to customers. For most of the Company's product sales, these criteria are met at the time the product is shipped; however, occasionally control passes later or earlier than shipment due to customer contract or letter of credit terms. In circumstances where credit is extended, payment terms generally range from 30 to 120 days and customer deposits may be required.

Revenue is measured as the amount of consideration the Company expects to be entitled to in exchange for transferring products or providing services. Expected returns and allowances are estimated and recognized based primarily on an analysis of historical experience, with Net sales presented net of such returns and allowances. The Company enters into sales arrangements that may provide for multiple performance obligations to a customer. These arrangements may include software and non-software components that function together to deliver the products' essential functionality. The Company identifies all performance obligations that are to be delivered separately under the sales arrangement and allocates revenue to each performance obligation based on its relative standalone selling price. The Company uses an observable price to determine the standalone selling price or a cost plus margin approach when one is not available. In general, performance obligations include hardware, integration and installation services. The allocated revenue for each performance obligation is recognized as such performance obligations are satisfied. Net sales include sales of products and billed freight related to product sales. Freight has not historically comprised a material component of Net sales. The Company has elected to account for such shipping and handling activities as a fulfillment cost and not as a separate performance obligation. Taxes collected from customers and remitted to governmental authorities are recorded on a net basis and are excluded from Net sales.

On January 1, 2018, the Company adopted ASC 606, Revenue from Contracts with Customers, as amended, and created by ASU 2014-09, Revenue from Contracts with Customers. See Note 2 - Revenue Recognition to the accompanying consolidated financial statements for further discussion regarding the impact of the adoption on the Company's revenue recognition accounting policies.

Income Taxes

Deferred tax assets and liabilities are recognized for the estimated future tax consequences attributable to differences between the financial statement carrying values of existing assets and liabilities and their respective tax bases. Deferred tax assets are also recorded with respect to net operating losses and other tax attribute carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates in effect for the years in which temporary differences are expected to be recovered or settled. Valuation allowances are established when it is more likely than not that deferred tax assets will not be realized. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in the income of the period that includes the enactment date.

Impact of the 2017 Tax Act

In December 2017, the 2017 Tax Act was enacted. Among its provisions, the 2017 Tax Act reduced the U.S. federal corporate tax rate from 35% to 21% (effective in 2018), required companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred and created new taxes on certain foreign sourced earnings, including a new minimum tax on Global Intangible Low-Taxed Income ("GILTI"). As a result of the 2017 Tax Act, the Company remeasured its U.S. deferred tax assets and liabilities at the lower rate, recording a net tax benefit of \$23.0 million as a component of Income tax expense on the Consolidated Statement of Operations for the year ended December 31, 2017.

In addition, the 2017 Tax Act moved the U.S. from a worldwide system of taxation to a territorial system and changed the rules that enabled taxpayers to generate foreign source income related to export sales. As a result of these changes, the Company concluded that it was not “more likely than not” that it could utilize its existing foreign tax credits within the applicable carryforward period and recognized a \$3.0 million valuation allowance against the Company’s foreign tax credits as of December 31, 2017.

Table of Contents

The 2017 Tax Act also provides for a one-time “transition tax” on untaxed post-1986 accumulated E&P of a CFC determined as of November 2, 2017 or December 31, 2017 (whichever date on which there is more deferred E&P). Cash and cash equivalents are taxed at an effective rate of 15.5% and earnings in excess of the cash position are taxed at an effective rate of 8%. The 2017 Tax Act permits the netting of positive earnings of one CFC against deficits of others. At both November 2, 2017 and December 31, 2017, the accumulated undistributed earnings of the Company’s foreign subsidiaries aggregated to an overall E&P deficit. Therefore, the Company did not have a transition tax liability under the provisions of the 2017 Tax Act. As of December 31, 2018, the Company continues to assert that its undistributed earnings of certain foreign subsidiaries are indefinitely reinvested. The Company will continue to evaluate its U.S. and foreign cash needs and, as circumstances change, may change its assertion related to all or a portion of its undistributed foreign earnings.

Due to the complexities of implementing the provisions of the 2017 Tax Act, the SEC staff issued Staff Accounting Bulletin No. 118 (“SAB 118”), which provides guidance on the accounting for the tax effects of the 2017 Tax Act and permits a measurement period not to exceed one year from the enactment date for companies to complete the required analyses and accounting. The consolidated financial statements for the year ended December 31, 2017 included the Company’s provisional estimates of the impact of the 2017 Tax Act, in accordance with SAB 118. The SAB 118 measurement period ended during the fourth quarter of 2018 and the Company had no significant measurement period adjustments. Additionally, the Company has completed its assessment of GILTI and has established a policy to account for this tax as a period expense in the year it is incurred.

Valuation Allowances

The guidance on accounting for income taxes provides important factors in determining whether a deferred tax asset will be realized, including whether there has been sufficient taxable income in recent years and whether sufficient income can reasonably be expected in future years in order to utilize the deferred tax asset. A high degree of judgment is required to determine if, and the extent that, valuation allowances should be recorded against deferred tax assets. A valuation allowance is required to be established or maintained when, based on currently available information and other factors, it is more likely than not that all or a portion of a deferred tax asset will not be realized.

We continually evaluate the need to maintain a valuation allowance for deferred tax assets based on our assessment of whether it is more likely than not that deferred tax benefits will be realized through the generation of future taxable income. Appropriate consideration is given to all available evidence, both positive and negative, in assessing the need for a valuation allowance.

There were no significant changes in judgment related to the realizability of deferred tax assets during the year ended December 31, 2018. At December 31, 2018, the total valuation allowance recorded against the Company’s deferred tax assets was \$9.4 million, comprised of a \$5.3 million valuation allowance recorded against state net operating loss carryforwards, a \$1.0 million valuation allowance recorded against foreign net deferred tax assets, inclusive of a \$0.8 million valuation allowance against net deferred tax assets in the U.K., and a \$3.1 million valuation allowance recorded against the Company’s foreign tax credits, primarily as a result of the 2017 Tax Act, as discussed above.

Unrecognized Tax Benefits

Accounting for uncertainty in income taxes addresses the determination of whether tax benefits claimed or expected to be claimed on a tax return should be recorded in the consolidated financial statements. We recognize the tax benefit from an uncertain tax position if it is more likely than not that the tax position will be sustained on examination by taxing authorities, based on the technical merits of the position. The tax benefits recognized in the consolidated financial statements from such a position are measured based on the largest benefit that has a greater than 50% likelihood of being realized upon ultimate settlement.

The guidance on accounting for uncertainty in income taxes also outlines de-recognition and classification, and requires companies to elect and disclose their method of reporting interest and penalties on income taxes. We recognize interest and penalties related to uncertain tax positions as part of income tax expense.

We believe that our approach to the associated estimates and judgments applied to our tax positions as described herein is reasonable; however, actual results could differ and we may be exposed to increases or decreases in income

taxes that could be material.

For further discussion related to the impact of the 2017 Tax Act, valuation allowances, unrecognized tax benefits and other tax matters, refer to Note 9 – Income Taxes to the accompanying consolidated financial statements.

32

Table of Contents

Item 7A. Quantitative and Qualitative Disclosures about Market Risk.

The Company is subject to market risk associated with changes in interest rates and foreign exchange rates. To mitigate this risk, the Company may utilize derivative financial instruments, including interest rate swaps and foreign currency forward contracts. The Company does not hold or issue derivative financial instruments for trading or speculative purposes and is not party to leveraged derivatives contracts.

Interest Rate Risk

Our debt instruments subject us to market risk associated with movements in interest rates. The fair value of the Company's total debt obligations held at December 31, 2018 was \$210.1 million. On June 2, 2017, the Company entered into an interest rate swap with a notional amount of \$150.0 million, as a means of fixing the floating interest rate component on \$150.0 million of its variable-rate debt. See Note 8 – Debt to the accompanying consolidated financial statements for a description of our debt agreements. A hypothetical 1% increase or decrease in variable interest rates in 2018 would increase or decrease annual interest expense by approximately \$0.6 million, based on current debt levels.

Foreign Exchange Rate Risk

Although the majority of the Company's sales, expenses and cash flow are transacted in U.S. dollars, the Company has exposure to changes in foreign exchange rates, primarily the Canadian Dollar, Euro and British pound. The impact of currency movements on our financial results is largely mitigated by natural hedges in our operations. The Canadian operations of JJE primarily conduct business in Canadian dollars. Almost all other sales of product from the U.S. to other parts of the world are denominated in U.S. dollars. Sales from and within other currency zones are predominantly transacted in the currency of the country sourcing the product or service. Approximately 78% of our total sales are conducted within the U.S. and are transacted in U.S. dollars. Management estimates that a 10% appreciation of the U.S. dollar against other currencies would reduce full-year net sales by approximately 2% and operating income by approximately 1%.

The Company may also have foreign currency exposures related to buying and selling in currencies other than the local currency in which it operates and to certain balance sheet positions. If such transactional or balance sheet exposures are material, the Company may enter into matching foreign currency forward contracts from time to time to protect against variability in exchange rates.

Table of Contents

Item 8. Financial Statements and Supplementary Data.

FEDERAL SIGNAL CORPORATION

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

	Page
<u>Reports of Independent Registered Public Accounting Firm</u>	<u>35</u>
<u>Consolidated Statements of Operations for the Years Ended December 31, 2018, 2017 and 2016</u>	<u>37</u>
<u>Consolidated Statements of Comprehensive Income for the Years Ended December 31, 2018, 2017 and 2016</u>	<u>38</u>
<u>Consolidated Balance Sheets as of December 31, 2018 and 2017</u>	<u>39</u>
<u>Consolidated Statements of Cash Flows for the Years Ended December 31, 2018, 2017 and 2016</u>	<u>40</u>
<u>Consolidated Statements of Stockholders' Equity for the Years Ended December 31, 2018, 2017 and 2016</u>	<u>41</u>
<u>Notes to Consolidated Financial Statements</u>	<u>42</u>
<u>Note 1 – Summary of Significant Accounting Policies</u>	<u>42</u>
<u>Note 2 - Revenue Recognition</u>	<u>48</u>
<u>Note 3 – Acquisitions</u>	<u>49</u>
<u>Note 4 – Inventories</u>	<u>53</u>
<u>Note 5 – Properties and Equipment, Net</u>	<u>53</u>
<u>Note 6 – Rental Equipment</u>	<u>53</u>
<u>Note 7 – Goodwill and Other Intangible Assets</u>	<u>54</u>
<u>Note 8 – Debt</u>	<u>54</u>
<u>Note 9 – Income Taxes</u>	<u>57</u>
<u>Note 10 – Pensions</u>	<u>60</u>
<u>Note 11 – Commitments and Contingencies</u>	<u>65</u>
<u>Note 12 – Legal Proceedings</u>	<u>66</u>
<u>Note 13 – Earnings Per Share</u>	<u>71</u>
<u>Note 14 – Stock-based Compensation</u>	<u>72</u>
<u>Note 15 – Stockholders' Equity</u>	<u>75</u>
<u>Note 16 – Segment Information</u>	<u>77</u>
<u>Note 17 – Fair Value Measurements</u>	<u>79</u>
<u>Note 18 – Discontinued Operations</u>	<u>80</u>
<u>Note 19 – New Accounting Pronouncements (Issued but Not Yet Adopted)</u>	<u>82</u>
<u>Note 20 – Selected Quarterly Data (Unaudited)</u>	<u>83</u>

Table of Contents

Report of Independent Registered Public Accounting Firm
To the Board of Directors and Stockholders of Federal Signal Corporation
Oak Brook, Illinois
Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Federal Signal Corporation and subsidiaries (the “Company”) as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income, stockholders’ equity, and cash flows for each of the three years in the period ended December 31, 2018, and the related notes and the financial statement schedule listed in the Index at Item 15 (collectively referred to as the “consolidated financial statements”). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company’s internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated February 28, 2019, expressed an unqualified opinion on the Company’s internal control over financial reporting.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Deloitte & Touche LLP
Chicago, Illinois
February 28, 2019

We have served as the Company’s auditor since 2013.

Table of Contents

Report of Independent Registered Public Accounting Firm
To the Board of Directors and Stockholders of Federal Signal Corporation
Oak Brook, Illinois

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Federal Signal Corporation and subsidiaries (the “Company”) as of December 31, 2018, based on criteria established in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control — Integrated Framework (2013) issued by COSO. We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements, as of and for the year ended December 31, 2018, of the Company and our report dated February 28, 2019 expressed an unqualified opinion on those financial statements.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management’s Annual Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that the controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Deloitte & Touche LLP
Chicago, Illinois
February 28, 2019

Table of ContentsFEDERAL SIGNAL CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS

(in millions, except per share data)	For the Years Ended		
	December 31,		
	2018	2017	2016
Net sales	\$1,089.5	\$898.5	\$707.9
Cost of sales	807.4	677.3	524.5
Gross profit	282.1	221.2	183.4
Selling, engineering, general and administrative expenses	159.1	144.3	119.5
Acquisition and integration-related expenses	1.5	2.7	1.4
Restructuring	—	0.6	1.7
Operating income	121.5	73.6	60.8
Interest expense	9.3	7.3	1.9
Debt settlement charges	—	—	0.3
Pension settlement charges	—	6.1	—
Other expense (income), net	0.6	(0.8)	1.8
Income before income taxes	111.6	61.0	56.8
Income tax expense	17.9	0.5	17.4
Income from continuing operations	93.7	60.5	39.4
Gain from discontinued operations and disposal, net of income tax expense (benefit) of \$0.1, \$(0.8) and \$3.4, respectively	0.3	1.1	4.4
Net income	\$94.0	\$61.6	\$43.8
Basic earnings per share:			
Earnings from continuing operations	\$1.56	\$1.01	\$0.65
Earnings from discontinued operations and disposal, net of tax	0.01	0.02	0.07
Net earnings per share	\$1.57	\$1.03	\$0.72
Diluted earnings per share:			
Earnings from continuing operations	\$1.53	\$1.00	\$0.64
Earnings from discontinued operations and disposal, net of tax	0.01	0.02	0.07
Net earnings per share	\$1.54	\$1.02	\$0.71
Weighted average shares outstanding:			
Basic	59.9	59.7	60.4
Diluted	61.2	60.4	61.2
See notes to consolidated financial statements.			

Table of ContentsFEDERAL SIGNAL CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(in millions)	For the Years Ended December 31,		
	2018	2017	2016
Net income	\$94.0	\$61.6	\$43.8
Other comprehensive (loss) income:			
Change in foreign currency translation adjustment	(6.4)	10.5	0.3
Change in unrecognized net actuarial loss and prior service cost related to pension benefit plans, net of income tax (benefit) expense of \$(0.6), \$1.3 and \$(2.1), respectively	(3.7)	3.6	(3.4)
Change in unrealized net gain on derivatives, net of income tax expense (benefit) of \$0.1, \$0.6 and \$(0.1), respectively	0.3	1.0	(0.1)
Total other comprehensive (loss) income	(9.8)	15.1	(3.2)
Comprehensive income	\$84.2	\$76.7	\$40.6
See notes to consolidated financial statements.			

Table of ContentsFEDERAL SIGNAL CORPORATION AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS

	As of December	
	31,	
(in millions, except per share data)	2018	2017
ASSETS		
Current assets:		
Cash and cash equivalents	\$37.4	\$37.5
Accounts receivable, net of allowances for doubtful accounts of \$1.6 and \$1.1, respectively	124.4	118.2
Inventories	157.3	137.2
Prepaid expenses and other current assets	9.4	10.9
Total current assets	328.5	303.8
Properties and equipment, net	62.0	60.1
Rental equipment, net	96.6	87.2
Goodwill	375.1	377.3
Intangible assets, net	143.1	151.8
Deferred tax assets	12.5	6.2
Deferred charges and other long-term assets	5.6	5.4
Long-term assets of discontinued operations	0.4	0.5
Total assets	\$1,023.8	\$992.3
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Current portion of long-term borrowings and capital lease obligations	\$0.2	\$0.3
Accounts payable	66.1	51.5
Customer deposits	10.1	6.5
Accrued liabilities:		
Compensation and withholding taxes	29.5	22.2
Other current liabilities	52.7	36.1
Current liabilities of discontinued operations	0.2	0.5
Total current liabilities	158.8	117.1
Long-term borrowings and capital lease obligations	209.9	277.4
Long-term pension and other post-retirement benefit liabilities	54.6	56.6
Deferred gain	6.8	8.7
Deferred tax liabilities	46.3	45.4
Other long-term liabilities	15.9	28.2
Long-term liabilities of discontinued operations	1.4	1.5
Total liabilities	493.7	534.9
Stockholders' equity:		
Common stock, \$1 par value per share, 90.0 shares authorized, 66.4 and 66.1 shares issued, respectively	66.4	66.1
Capital in excess of par value	217.0	207.7
Retained earnings	432.5	346.6
Treasury stock, at cost, 6.2 and 6.1 shares, respectively	(88.5)	(86.1)
Accumulated other comprehensive loss	(97.3)	(76.9)
Total stockholders' equity	530.1	457.4
Total liabilities and stockholders' equity	\$1,023.8	\$992.3
See notes to consolidated financial statements.		

Table of ContentsFEDERAL SIGNAL CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS

	For the Years Ended December 31,		
(in millions)	2018	2017	2016
Operating activities:			
Net income	\$94.0	\$61.6	\$43.8
Adjustments to reconcile net income to net cash provided by operating activities:			
Net gain on discontinued operations and disposal	(0.3)	(1.1)	(4.4)
Depreciation and amortization	36.4	30.0	19.1
Deferred financing costs	0.4	0.3	0.6
Deferred gain	(1.9)	(2.0)	(1.9)
Stock-based compensation expense	7.6	4.6	4.8
Pension settlement charges	—	6.1	—
Pension expense, net of funding	(7.8)	(5.2)	(3.7)
Changes in fair value of contingent consideration and deferred payment	1.1	1.0	0.5
Deferred income taxes, including change in valuation allowance	(5.6)	(14.9)	7.9
Changes in operating assets and liabilities, net of effects of discontinued operations:			
Accounts receivable	(7.9)	(11.1)	(8.0)
Inventories	(22.6)	9.4	(2.3)
Rental equipment	(30.6)	(15.7)	(6.9)
Prepaid expenses and other current assets	(1.0)	3.9	1.6
Accounts payable	15.6	(5.2)	(13.9)
Customer deposits	3.7	1.5	—
Accrued liabilities	8.2	8.0	(7.4)
Income taxes	2.2	1.6	(4.4)
Other	1.3	0.7	1.3
Net cash provided by continuing operating activities	92.8	73.5	26.7
Net cash used for discontinued operating activities	—	(0.7)	(2.0)
Net cash provided by operating activities	92.8	72.8	24.7
Investing activities:			
Purchases of properties and equipment	(14.1)	(8.0)	(6.1)
Proceeds from (payments for) acquisitions, net of cash acquired	3.0	(269.2)	(102.6)
Cash collected from customer	—	—	6.0
Other, net	0.1	0.1	(0.3)
Net cash used for continuing investing activities	(11.0)	(277.1)	(103.0)
Net cash (used for) provided by discontinued investing activities	—	(1.1)	86.2
Net cash used for investing activities	(11.0)	(278.2)	(16.8)
Financing activities:			
(Decrease) increase in revolving lines of credit, net	(62.1)	209.1	64.8
Payments on long-term borrowings	—	—	(43.4)
Payments of debt financing fees	—	(0.2)	(1.1)
Purchases of treasury stock	(1.2)	—	(37.8)
Redemptions of common stock to satisfy withholding taxes related to stock-based compensation	(0.5)	(2.9)	(2.7)
Cash dividends paid to stockholders	(18.7)	(16.8)	(16.9)
Proceeds from stock compensation activity	1.3	1.6	0.5

Other, net	—	(0.1)	(0.5)
Net cash (used for) provided by continuing financing activities	(81.2)	190.7	(37.1)
Net cash provided by discontinued financing activities	—	—	0.7
Net cash (used for) provided by financing activities	(81.2)	190.7	(36.4)
Effects of foreign exchange rate changes on cash and cash equivalents	(0.7)	1.5	(1.8)
(Decrease) increase in cash and cash equivalents	(0.1)	(13.2)	(30.3)
Cash and cash equivalents at beginning of year	37.5	50.7	81.0
Cash and cash equivalents at end of year	\$37.4	\$37.5	\$50.7
See notes to consolidated financial statements.			

Table of ContentsFEDERAL SIGNAL CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

(in millions, except per share data)	Common Stock Par Value	Capital in Excess of Par Value	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive Loss	Total
Balance at January 1, 2016	\$ 64.8	\$ 195.6	\$ 274.9	\$ (40.9)	\$ (88.8)	\$ 405.6
Net income			43.8			43.8
Total other comprehensive loss					(3.2)	(3.2)
Cash dividends declared (\$0.28 per share)			(16.9)			(16.9)
Stock-based payments:						
Stock-based compensation		4.3				4.3
Stock option exercises and other	0.2	0.8		(0.3)		0.7
Performance share unit transactions	0.4	(0.4)		(2.4)		(2.4)
Stock repurchase program				(37.8)		(37.8)
Balance at December 31, 2016	65.4	200.3	301.8	(81.4)	(92.0)	394.1
Net income			61.6			61.6
Total other comprehensive income					15.1	15.1
Cash dividends declared (\$0.28 per share)			(16.8)			(16.8)
Stock-based payments:						
Stock-based compensation		4.0				4.0
Stock option exercises and other	0.5	3.6		(2.8)		1.3
Performance share unit transactions	0.2	(0.2)		(1.9)		(1.9)
Balance at December 31, 2017	66.1	207.7	346.6	(86.1)	(76.9)	457.4
Net income			94.0			94.0
Total other comprehensive loss					(9.8)	(9.8)
Cash dividends declared (\$0.31 per share)			(18.7)			(18.7)
Impact of adoption of ASU 2018-02			10.6		(10.6)	—
Stock-based payments:						
Stock-based compensation		7.0				7.0
Stock option exercises and other	0.3	2.3		(1.2)		1.4
Stock repurchase program				(1.2)		(1.2)
Balance at December 31, 2018	\$ 66.4	\$ 217.0	\$ 432.5	\$ (88.5)	\$ (97.3)	\$ 530.1

See notes to consolidated financial statements.

Table of Contents

FEDERAL SIGNAL CORPORATION AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
NOTE 1 — SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Organization and Description of the Business

Federal Signal Corporation was founded in 1901 and was reincorporated as a Delaware corporation in 1969.

References herein to the “Company,” “we,” “our” or “us” refer collectively to Federal Signal Corporation and its subsidiaries.

Products manufactured and services rendered by the Company are divided into two reportable segments:

Environmental Solutions Group and Safety and Security Systems Group. The individual operating businesses are organized as such because they share certain characteristics, including technology, marketing, distribution and product application, which create long-term synergies.

Our fiscal year ends on December 31. All references to 2018, 2017 and 2016 relate to the fiscal year unless otherwise indicated.

Basis of Presentation and Consolidation

The accompanying consolidated financial statements represent the consolidation of Federal Signal Corporation and its subsidiaries and have been prepared by the Company pursuant to the rules and regulations of the Securities and Exchange Commission (“SEC”) and in accordance with United States (“U.S.”) generally accepted accounting principles (“GAAP”).

Intercompany balances and transactions have been eliminated in consolidation. In addition, certain prior year amounts have been reclassified to conform to current year presentation.

New Accounting Standards Adopted in 2018

In May 2014, the Financial Accounting Standards Board (the “FASB”) issued Accounting Standards Update (“ASU”) No. 2014-09, Revenue from Contracts with Customers (“Topic 606”), which supersedes the revenue recognition requirements in Accounting Standards Codification (“ASC”) 605, Revenue Recognition. Topic 606 is based on the principle that revenue is recognized to depict the transfer of goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. Topic 606 also requires additional disclosure about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments and changes in judgments, and assets recognized from costs incurred to obtain or fulfill a contract. The Company adopted this guidance on January 1, 2018 using the modified retrospective transition method. See Note 2 – Revenue Recognition for further details.

In August 2016, the FASB issued ASU No. 2016-15, Statement of Cash Flows (Topic 230), Classification of Certain Cash Receipts and Payments, which provides additional guidance on the financial statement presentation of certain activities in the statement of cash flows. The activities addressed by this guidance that may be relevant to the Company include cash payments for debt prepayment or debt extinguishment costs, contingent consideration payments made after a business combination, proceeds from the settlement of insurance claims and proceeds from the settlement of corporate-owned life insurance policies, and the application of the predominance principle. The amendments in this ASU are effective for fiscal years beginning after December 15, 2017 and interim periods within those fiscal years. The amendments in this ASU should be applied using a retrospective transition method to each period presented. If it is impracticable to apply the amendments retrospectively for some of the issues, the amendments for those issues would be applied prospectively as of the earliest date practicable. The Company adopted this guidance on January 1, 2018 and concluded that it did not have a material impact on its historical cash flow presentation.

In October 2016, the FASB issued ASU No. 2016-16, Income Taxes (Topic 740), Intra-Entity Transfers of Assets Other Than Inventory. This guidance requires the income tax consequences of an intra-entity transfer of an asset other than inventory to be recognized when the transfer occurs, instead of when the asset is sold to an outside party. The pronouncement is effective for annual reporting periods beginning after December 15, 2017, including interim reporting periods within those annual reporting periods, with early adoption permitted. The amendments in this ASU should be applied on a modified retrospective basis, with an adjustment reflecting the cumulative effect of adoption

being recorded directly to retained earnings as of the beginning of the period of adoption. The Company adopted this guidance on January 1, 2018 and concluded that it did not have a material impact on its consolidated financial statements.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

In January 2017, the FASB issued ASU No. 2017-04, Intangibles – Goodwill and Other (Topic 350), Simplifying the Test for Goodwill Impairment, which eliminates the second step of the two-step quantitative approach for testing goodwill for potential impairment. An entity will therefore perform the goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount, and recognize an impairment charge for the amount by which the carrying amount exceeds the fair value, not to exceed the total amount of goodwill allocated to the reporting unit. An entity still has the option to perform a qualitative assessment to determine if the quantitative impairment test is necessary. ASU 2017-04 is effective for fiscal years beginning after December 15, 2019 on a prospective basis, with early adoption permitted. The Company elected to early adopt this guidance on January 1, 2018, and applied it to its goodwill impairment testing in 2018.

In March 2017, the FASB issued ASU No. 2017-07, Compensation – Retirement Benefits (Topic 715), Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost. This guidance requires that entities present the service cost component of net periodic pension expense in the same income statement line items as other employee compensation costs. All other components of net periodic pension cost should be reported separately from the service cost component and outside a subtotal of operating income. The Company adopted this guidance effective January 1, 2018 following the retrospective method of adoption. The Consolidated Statements of Operations presented herein have been recast to present components of net periodic pension expense, other than service cost, as a component of Other expense (income), net or Pension settlement charges, as applicable.

The following table summarizes the impact of ASU 2017-07 on the Company's previously reported Consolidated Statements of Operations:

(in millions)	For the Year Ended December 31, 2017			For the Year Ended December 31, 2016		
	As Reported	Impact of Adoption	As Adjusted	As Reported	Impact of Adoption	As Adjusted
Cost of sales	\$677.3	\$ —	\$ 677.3	\$524.8	\$ (0.3)	\$ 524.5
Selling, engineering, general and administrative expenses	144.7	(0.4)	144.3	122.3	(2.8)	119.5
Pension settlement charges (operating expense)	6.1	(6.1)	—	—	—	—
Pension settlement charges (non-operating expense)	—	6.1	6.1	—	—	—
Other expense (income), net	(1.2)	0.4	(0.8)	(1.3)	3.1	1.8

In August 2017, the FASB issued ASU No. 2017-12, Derivatives and Hedging (Topic 815), Targeted Improvements to Accounting for Hedging Activities, which intends to better align risk management activities and financial reporting for hedging relationships through changes to both the designation and measurement guidance for qualifying hedging relationships and presentation of hedge results. The amendments also make certain targeted improvements to simplify the application of the hedge accounting guidance by easing certain documentation and assessment requirements. ASU 2017-12 is effective for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. Early adoption is permitted. The amendments in this ASU should be applied on a modified retrospective or prospective basis, depending on the area covered by the update. The Company elected to early adopt this guidance on

January 1, 2018 and concluded that it did not have a material impact on its consolidated financial statements. In February 2018, the FASB issued ASU No. 2018-02, Income Statement – Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income, that permits entities to reclassify tax effects stranded in accumulated other comprehensive income as a result of the Tax Cuts and Jobs Act (the “2017 Tax Act”) to retained earnings. ASU 2018-02 is effective for all entities for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. Early adoption is permitted. During the fourth quarter of 2018, the Company elected to early adopt ASU 2018-02 and recorded an adjustment to reclassify the stranded tax effects resulting from the 2017 Tax Act. The reclassification adjustment of \$10.6 million resulted in an increase of Retained earnings and Accumulated other comprehensive loss on the Company’s Consolidated Balance Sheet.

Non-U.S. Operations

Assets and liabilities of non-U.S. subsidiaries, other than those whose functional currency is the U.S. dollar, are translated at current exchange rates with the related translation adjustments reported in stockholders’ equity as a component of Accumulated other comprehensive loss. Accounts within the Consolidated Statements of Operations are translated at the average exchange rate during the period. Non-monetary assets and liabilities are translated at historical exchange rates.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Relating to transactions that are denominated in a currency other than the functional currency, the Company incurs foreign currency transaction gains or losses, which are recognized in the Consolidated Statements of Operations as a component of Other expense (income), net. For the years ended December 31, 2018 and 2016, the Company incurred foreign currency transaction losses of \$0.4 million and \$0.1 million, respectively, and in the year ended December 31, 2017, the Company realized foreign currency transaction gains of \$1.3 million.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect (i) the reported amounts of assets and liabilities, (ii) the disclosure of contingent assets and liabilities at the date of the consolidated financial statements and (iii) the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Cash Equivalents

The Company considers all highly liquid investments with a maturity of three months or less, when purchased, to be cash equivalents. The carrying amount of cash and cash equivalents approximates fair value because of the short-term maturity and highly liquid nature of these instruments.

Accounts Receivable

The Company carries accounts receivable at the face amount less an allowance for doubtful accounts for estimated losses as a result of a customer's inability to make required payments. Management evaluates the aging of the accounts receivable balances, the financial condition of its customers, historical trends and the time outstanding of specific balances to estimate the amount of accounts receivables that may not be collected in the future and records the appropriate provision.

Inventories

The Company's inventories are valued at the lower of cost and net realizable value. Cost is determined using the first-in, first-out method. Included in the cost of inventories are raw materials, direct wages and associated production costs.

Properties and Equipment

Properties and equipment are stated at cost, net of accumulated depreciation. Depreciation is recorded using the straight-line method over the estimated useful lives of the assets. Useful lives generally range from eight to 40 years for buildings and three to 15 years for machinery and equipment. Leasehold improvements are depreciated over the shorter of the remaining life of the lease or the useful life of the improvement. Depreciation expense is primarily included as a component of Cost of sales on the Consolidated Statements of Operations, with depreciation expense associated with certain assets used for administrative purposes being presented within Selling, engineering, general and administrative ("SEG&A") expenses. Depreciation expense, which includes depreciation on rental equipment, was \$28.4 million, \$25.2 million and \$18.9 million in the years ended December 31, 2018, 2017 and 2016, respectively. Properties and equipment are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable.

Rental Equipment

The Company enters into lease agreements with customers related to the rental of certain equipment. All of these leasing agreements are classified as operating leases and are for periods generally not to exceed five years. In accounting for these leases, the cost of the equipment purchased or manufactured by the Company is recorded as an asset and is depreciated over its estimated useful life. Rental income is recognized ratably over the term of the underlying leases.

Rental equipment is depreciated to an estimated residual value on a straight-line basis over the estimated useful lives of the assets and is reviewed for potential impairment whenever an event occurs or circumstances change that indicate the carrying amount of an asset may not be recoverable. If circumstances require a long-lived asset or asset group to be tested for possible impairment, the Company first compares non-discounted cash flows expected to be generated by that asset group to its carrying amount. If the carrying amount of the long-lived asset or asset group is not recoverable on a non-discounted cash flow basis, an impairment is recognized to the extent that the carrying amount exceeds fair value. Fair value is determined through various

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

valuation techniques including discounted cash flow models, quoted market values and third-party independent appraisals, as considered necessary.

Rental equipment includes certain equipment that is manufactured by the Company and subsequently transferred to the rental fleet, as well as equipment purchased from third-party manufacturers, for the purpose of renting to end-customers. The related cash flow activity associated with these transactions is reflected within operating activities on the Consolidated Statements of Cash Flows.

Goodwill

Goodwill represents the excess of the cost of an acquired business over the amounts assigned to its net assets.

Goodwill is not amortized but is tested for impairment at a reporting unit level on an annual basis or more frequently if indicators of impairment exist. The Company performed its annual goodwill impairment test as of October 31, 2018.

As discussed within the “New Accounting Standards Adopted in 2018” section above, the Company adopted ASU 2017-04 on January 1, 2018 and applied this guidance to its 2018 annual goodwill impairment test. Under ASU 2017-04, an entity performs the quantitative goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount, and recognizes an impairment charge for the amount by which the carrying amount exceeds the fair value, not to exceed the total amount of goodwill allocated to the reporting unit. An entity still has the option to perform a qualitative assessment to determine if the quantitative impairment test is necessary.

A qualitative approach is applied when the Company concludes that it is not “more likely than not” that the fair value of a reporting unit is less than its carrying value. In this situation, the Company would not be required to perform the quantitative impairment test described above. Management applied the qualitative approach to assess the goodwill of its reporting units for potential impairment in 2018 and concluded that it was not “more likely than not” that the fair value of the Company’s reporting units were less than their carrying values.

The Company had no goodwill impairments in 2018, 2017 or 2016. See Note 7 – Goodwill and Other Intangible Assets for a summary of the Company’s goodwill by segment.

Intangible Assets

Definite-lived intangible assets are amortized on a straight-line basis over the estimated useful lives and are tested for impairment if indicators exist in a manner similar to that described above for Rental Equipment.

Indefinite-lived intangible assets are tested for impairment on an annual basis at year-end, or more frequently if an event occurs or circumstances change that indicate the fair value of an indefinite-lived intangible asset could be below its carrying amount. In testing the indefinite-lived intangibles assets for potential impairment, the Company applies either a qualitative test, or a quantitative test, in accordance with ASC 350, Intangibles — Goodwill and Other. A qualitative approach is applied when the Company concludes that it is not “more likely than not” that the fair value of the indefinite-lived intangibles are less than their carrying value. A quantitative impairment test consists of comparing the fair value of the indefinite-lived intangible asset with its carrying amount. An impairment loss would be recognized for the carrying amount in excess of its fair value.

Management used a qualitative approach to assess its indefinite-lived intangible assets for potential impairment in 2018, 2017 and 2016. The Company concluded that it was not “more likely than not” that the fair value of indefinite-lived intangible assets were less than their carrying values.

The Company had no indefinite-lived intangible asset impairments in 2018, 2017 or 2016. See Note 7 – Goodwill and Other Intangible Assets for a summary of the Company’s intangible assets.

Warranties

Warranties are classified as either assurance-type or service-type warranties. A warranty is considered an assurance-type warranty if it provides the customer with assurance that the product will function as intended. A warranty that goes above and beyond ensuring basic functionality is considered a service-type warranty. The Company offers certain limited warranties that are assurance-type warranties and extended service arrangements that are service-type warranties. Assurance-type warranties are not accounted for as separate performance obligations under the revenue model. If a service-type warranty is sold with a product or separately, revenue is recognized over the life of the warranty.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Sales of many of the Company's products include assurance-type warranties based on terms that are generally accepted in the Company's marketplaces. The Company records provisions for estimated warranty costs, which are included within Cost of sales, at the time of sale based on historical experience. The Company periodically adjusts these provisions to reflect actual experience. Infrequently, a material warranty issue can arise which is beyond the scope of the Company's historical experience. The Company records costs related to these issues as they become probable and estimable.

The Company also sells optional service-type warranty contracts that extend coverage beyond the initial term of the express warranty period. At the time of sale, revenue related to the service-type warranty contract is deferred and recognized as income over the life of the contract. As of December 31, 2018 and 2017, deferred revenue associated with service-type warranty contracts was \$3.0 million and \$2.9 million, respectively, and was included within Other current liabilities and Other long-term liabilities on the Consolidated Balance Sheets. Costs under service-type warranty contracts are expensed as incurred.

Workers' Compensation and Product Liability Reserves

Due to the nature of the Company's manufacturing and products, the Company is subject to claims for workers' compensation and product liability in the normal course of business. The Company is self-funded for a portion of these claims. The Company establishes a reserve using a third-party actuary for any known outstanding matters, including a reserve for claims incurred but not yet reported. The amount and timing of cash payments relating to these claims are considered to be reliably determinable given the nature of the claims and historical claim volumes to support the actuarial assumptions and judgments used to derive the expected loss payment patterns. As such, the reserves recorded are discounted using a risk-free rate that matches the average duration of the claims.

The Company has not established a reserve for potential losses resulting from the firefighter hearing loss litigation, with the exception of certain estimated losses that have been recognized related to settlement discussions (see Note 12 – Legal Proceedings). If the Company is not successful in its defense after exhausting all appellate options, it would record a charge for such claims, to the extent they exceed insurance recoveries, when the related losses become probable and estimable.

Pensions

The Company sponsors domestic and foreign defined benefit pension plans. Key assumptions used in the accounting for these employee benefit plans include the discount rate, expected long-term rate of return on plan assets and estimates of future mortality of plan participants.

The weighted-average discount rate used to measure pension liabilities and costs is selected using a hypothetical portfolio of high-quality bonds that would provide the necessary cash flow to match the projected benefit payments of the plans. The discount rate represents the rate at which our benefit obligations could effectively be settled as of the year-end measurement date. The weighted-average discount rate used to measure pension liabilities increased from 2017 to 2018. See Note 10 – Pensions for further discussion.

The expected long-term rate of return on plan assets is based on historical and expected returns for the asset classes in which the plans are invested.

The Company references the most recent mortality tables and scales published by the Society of Actuaries in determining its estimate of future mortality.

Revenue Recognition

On January 1, 2018, the Company adopted ASC 606, Revenue from Contracts with Customers, as amended, and created by ASU 2014-09, Revenue from Contracts with Customers. See Note 2 – Revenue Recognition for further discussion regarding the impact of the adoption on the Company's revenue recognition accounting policies.

Product Shipping Costs

Product shipping costs are expensed as incurred and are included within Cost of sales.

Research and Development

The Company invests in research to support development of new products and the enhancement of existing products and services. Expenditures for research and development by the Company were \$13.0 million in 2018, \$13.0 million in 2017 and \$13.4 million in 2016, and are included within SEG&A expenses.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Stock-Based Compensation Plans

The Company has various stock-based compensation plans, described more fully in Note 14 – Stock-Based Compensation. Stock-based compensation expense is recorded net of estimated forfeitures in the Company’s Consolidated Statements of Operations. The Company estimates the forfeiture rate based on historical forfeitures of equity awards and adjusts the rate to reflect changes in facts and circumstances, if any. The Company revises its estimated forfeiture rate if actual forfeitures differ from its initial estimates.

Income Taxes

We file a consolidated U.S. federal income tax return for Federal Signal Corporation and its eligible domestic subsidiaries. Our non-U.S. subsidiaries file income tax returns in their respective local jurisdictions. We account for income taxes under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to temporary differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and tax benefit carryforwards. Deferred tax assets and liabilities at the end of each period are determined using enacted tax rates expected to apply to taxable income in the period in which the deferred tax liability or asset is expected to be settled or realized. A valuation allowance is established or maintained when, based on currently available information and other factors, it is more likely than not that all or a portion of a deferred tax asset will not be realized.

Accounting standards on accounting for uncertainty in income taxes address the determination of whether tax benefits claimed or expected to be claimed on a tax return should be recorded in the consolidated financial statements. Under the guidance on accounting for uncertainty in income taxes, we may recognize the tax benefit from an uncertain tax position only if it is more likely than not that the tax position will be sustained on examination by taxing authorities, based on the technical merits of the position. The tax benefits recognized in the consolidated financial statements from such a position are measured based on the largest benefit that has a greater than 50% likelihood of being realized upon ultimate settlement. The guidance on accounting for uncertainty in income taxes also outlines de-recognition and classification, as well as interest and penalties on income taxes.

Litigation Contingencies

The Company is subject to various claims, including pending and possible legal actions for product liability and other damages, and other matters arising in the ordinary course of the Company’s business. The Company believes, based on current knowledge and after consultation with counsel, that the outcome of such claims and actions in the aggregate will not have an adverse effect on the Company’s financial position or results of operations. However, in the event of unexpected future developments, it is possible that the ultimate resolution of such matters, if unfavorable, could have a material adverse effect on the Company’s results of operations. Professional legal fees are expensed when incurred. We accrue for contingent losses when such losses are probable and reasonably estimable. In the event that estimates or assumptions of contingent losses are different from actual results, adjustments are made in subsequent periods to reflect more current information.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

NOTE 2 – REVENUE RECOGNITION

Impact of the Adoption of Topic 606

On January 1, 2018, the Company adopted Topic 606 following the modified retrospective method of adoption applied to those contracts that were not completed as of the date of adoption. In accordance with the Topic 606 transition guidance, the financial information in the comparative periods presented herein has not been restated and continues to be reported under the accounting standards in effect for those periods.

The adoption of Topic 606 did not have a material impact on the Company's financial position, results of operations or cash flows. However, the Company's Consolidated Statement of Operations for the year ended December 31, 2018 includes a reduction in Net sales of approximately 1% within the Environmental Solutions Group based on a revised "Principal vs. Agent" analysis resulting in a change from gross to net presentation, with a corresponding reduction in Cost of sales.

The following table summarizes the impact of the adoption of Topic 606 on the Company's Consolidated Statements of Operations for the year ended December 31, 2018:

	Year Ended December 31, 2018		
(in millions)	As Reported	Balances Without Adoption of Topic 606	Effect of Change
Net sales	\$1,089.5	\$1,104.8	\$(15.3)
Cost of sales	807.4	822.7	(15.3)
Gross profit	\$282.1	\$282.1	\$—

Revenue Recognition

Revenue is recognized when performance obligations under the terms of a contract with the customer are satisfied; generally this occurs at a point in time, with the transfer of control of the Company's products or services to customers. For most of the Company's product sales, these criteria are met at the time the product is shipped; however, occasionally control passes later or earlier than shipment due to customer contract or letter of credit terms. In circumstances where credit is extended, payment terms generally range from 30 to 120 days and customer deposits may be required.

Revenue is measured as the amount of consideration the Company expects to be entitled to in exchange for transferring products or providing services. Expected returns and allowances are estimated and recognized based primarily on an analysis of historical experience, with Net sales presented net of such returns and allowances.

The Company enters into sales arrangements that may provide for multiple performance obligations to a customer. These arrangements may include software and non-software components that function together to deliver the products' essential functionality. The Company identifies all performance obligations that are to be delivered separately under

the sales arrangement and allocates revenue to each performance obligation based on its relative standalone selling price. The Company uses an observable price to determine the standalone selling price or a cost plus margin approach when one is not available. In general, performance obligations include hardware, integration and installation services. The allocated revenue for each performance obligation is recognized as such performance obligations are satisfied. Net sales include sales of products and billed freight related to product sales. Freight has not historically comprised a material component of Net sales. The Company has elected to account for such shipping and handling activities as a fulfillment cost and not as a separate performance obligation. Taxes collected from customers and remitted to governmental authorities are recorded on a net basis and are excluded from Net sales.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Information relating to the disaggregation of Net sales by geographic region, based on the location of the end customer, is included in Note 16 – Segment Information. The following table presents the Company’s Net sales disaggregated by major product line:

(in millions)	Year Ended December 31, 2018
Environmental Solutions	
Vehicles and equipment ^(a)	\$ 687.2
Parts	118.6
Rental income ^(b)	41.8
Other ^(c)	15.9
Total net sales	\$ 863.5
Safety and Security Systems	
Public safety and security equipment	134.3
Industrial signaling equipment	53.4
Warning systems	38.3
Total net sales	\$ 226.0
 Total net sales	 \$ 1,089.5

(a) Includes net sales from the sale of new and used vehicles and equipment, including sales of rental equipment.

(b) Represents income from vehicle and equipment lease arrangements with customers, recognized in accordance with Topic 840.

(c) Primarily includes revenues from services such as maintenance and repair work and the sale of extended warranty contracts.

Contract Balances

The Company recognizes contract liabilities when cash payments, such as customer deposits, are received in advance of the Company’s satisfaction of the related performance obligations. Contract liabilities are recognized as Net sales when the related performance obligations are satisfied, which generally occurs within three to six months of the cash receipt. Contract liability balances are not materially impacted by any other factors. The Company’s contract liabilities were \$12.1 million and \$8.9 million, as of December 31, 2018 and 2017, respectively. Contract assets, such as unbilled receivables, were not material as of any of the periods presented herein.

Practical Expedients

As the Company’s standard payment terms are less than a year, the Company has elected the practical expedient under ASC 606-10-32-18 to not assess whether a contract has a significant financing component.

The Company has also elected the practical expedient under ASC 340-40-25-4 and recognizes the incremental costs of obtaining a contract, such as sales commissions, as expense when incurred as the amortization period of the asset that otherwise would have been recognized is one year or less.

Further, as permitted by ASC 606-10-50-14, the Company does not disclose the value of its remaining performance obligations for contracts with an original expected duration of one year or less.

NOTE 3 – ACQUISITIONS

Acquisition of TBEI

On June 2, 2017, the Company completed the acquisition of all of the outstanding shares of capital stock of GenNx/TBEI Intermediate Co., a Delaware corporation, (collectively, with its subsidiaries, “TBEI”). TBEI is a leading U.S. manufacturer of dump truck bodies and trailers serving maintenance and infrastructure end markets. The Company expects that the acquisition of TBEI will enable it to strengthen the Environmental Solutions Group’s market position as a specialty vehicle manufacturer in maintenance and infrastructure markets, leverage its expertise in building chassis-based vehicles and balance the mix of revenues it generates from municipal and industrial markets. The acquisition closed on June 2, 2017, and the assets and

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

liabilities of TBEI have been consolidated into the Consolidated Balance Sheet since that date, while the post-acquisition results of operations have been included in the Consolidated Statements of Operations, within the Environmental Solutions Group.

The Company initially paid \$271.8 million to acquire TBEI, inclusive of cash acquired. The purchase price was subsequently reduced by an adjustment for working capital and other post-closing items in the amount of \$3.0 million, which was received in the first quarter of 2018.

The Company's purchase price allocation was finalized during the year ended December 31, 2017. The following table summarizes the fair value of assets acquired and liabilities assumed as of the acquisition date:

(in millions)

Purchase price, inclusive of adjustment for working capital and other post-closing items ^(a)	\$268.8
Total consideration	268.8
Cash	2.6
Accounts receivable	23.7
Inventories	24.3
Prepaid expenses and other current assets	2.6
Rental equipment	0.7
Properties and equipment	20.6
Customer relationships ^(b)	90.0
Trade names ^(c)	54.0
Other intangible assets	1.7
Accounts payable	(18.7)
Accrued liabilities	(7.3)
Deferred tax liabilities	(61.4)
Net assets acquired	\$132.8
Goodwill ^(d)	\$136.0

\$243.0 million of the purchase price was funded through borrowings under the Company's revolving credit facility, (a) with the remainder being funded with existing cash on hand. The purchase price includes an adjustment for working capital and other post-closing items of \$3.0 million that the Company received in the first quarter of 2018.

(b) Represents the fair value assigned to customer relationships, which are considered to be definite-lived intangible assets, with an estimated useful life of approximately 12 years.

(c) Represents the fair value assigned to trade names, which are considered to be indefinite-lived intangible assets.

(d) Goodwill, which is not deductible for tax purposes, has been allocated to the Environmental Solutions Group on the basis that the synergies identified will primarily benefit this segment.

Under ASC 805-10, acquisition-related costs (i.e., advisory, legal, valuation and other professional fees) are not included as a component of consideration transferred, but are accounted for as expenses in the periods in which the costs are incurred. During the years ended December 31, 2018 and 2017, the Company incurred acquisition and integration-related costs of \$0.4 million and \$1.7 million, respectively, primarily related to the TBEI acquisition. In the year ended December 31, 2016, the Company incurred \$0.9 million of acquisition and integration-related costs in connection with acquisitions completed in 2016. Such costs have been included as a component of Acquisition and integration-related expenses on the Consolidated Statement of Operations.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Unaudited Pro Forma Financial Information

The following table presents the unaudited pro forma combined results of operations of the Company and TBEI for the years ended December 31, 2017 and 2016, after giving effect to certain pro forma adjustments including: (i) elimination of the costs recognized related to the step-up in fair value of TBEI's inventory that will not have a continuing impact, (ii) amortization of acquired intangible assets, (iii) the impact of certain fair value adjustments such as depreciation on the acquired property, plant and equipment, (iv) interest expense for historical long-term debt of TBEI that was repaid and interest expense on additional borrowings by the Company to fund the acquisition and (v) elimination of non-recurring acquisition and integration-related expenses. The unaudited pro forma statement of operations of the Company assuming this transaction occurred at January 1, 2016 is as follows:

(in millions, except per share data)	For the Year Ended December 31,	
	2017	2016
Net sales	\$987.6	\$913.2
Income from continuing operations	68.1	49.4
Diluted earnings from continuing operations (per share)	\$1.13	\$0.81

The unaudited pro forma financial information is presented for informational purposes only and is not intended to represent or be indicative of the consolidated results of operations of the Company that would have been reported had the acquisition been completed as of the beginning of the periods presented, and should not be taken as being representative of the future consolidated results of operations of the Company.

Acquisition of JJE

On June 3, 2016, the Company completed the acquisition of substantially all of the assets and operations of Joe Johnson Equipment, Inc. and Joe Johnson Equipment (USA), Inc. (collectively, "JJE"), a Canadian-based distributor of maintenance equipment for municipal and industrial markets. The Company expects that JJE will facilitate sales of its existing products into new markets, expand the Company's product and service offerings and increase the Company's footprint across North America. The acquisition closed on June 3, 2016, and the assets and liabilities of JJE have been consolidated into the Consolidated Balance Sheet since that date, while the post-acquisition results of operations have been included in the Consolidated Statements of Operations, within the Environmental Solutions Group.

The initial cash consideration paid by the Company to acquire JJE was approximately \$96.6 million, inclusive of a payment of a working capital adjustment. In addition, there is a deferred payment of C\$8.0 million (approximately \$5.9 million) and a contingent earn-out payment of up to C\$10.0 million (approximately \$7.3 million). The earn-out payment is contingent upon the achievement of certain financial targets and objectives. The deferred payment, and any contingent earn-out payment, are due to be paid after the third anniversary of the closing date and are included within Other current liabilities and Other long-term liabilities on the Consolidated Balance Sheets as of December 31, 2018 and 2017, respectively.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The Company's purchase price allocation was finalized during the year ended December 31, 2016. The following table summarizes the fair value of assets acquired and liabilities assumed as of the acquisition date:

(in millions)

Purchase price, inclusive of working capital adjustment ^(a)	\$96.6
Estimated fair value of additional consideration ^(b)	10.3
Settlement of pre-existing contractual relationship ^(c)	11.4
Total consideration	118.3

Accounts receivable	12.1
Inventories	28.7
Prepaid expenses and other current assets	0.8
Rental equipment ^(d)	75.9
Properties and equipment	2.0
Intangible assets ^(e)	8.4
Capital lease obligations	(0.5)
Accounts payable ^(c)	(11.5)
Customer deposits	(0.8)
Accrued liabilities	(2.0)
Net assets acquired	113.1

Goodwill ^(f) \$5.2

^(a) The initial purchase price was funded with existing cash on hand and borrowings under the Company's revolving credit facility.

Includes estimated fair value of contingent earn-out payment (\$4.9 million) and the deferred payment (\$5.4 million) as of the acquisition date. Included as a component of Other long-term liabilities on the Consolidated Balance Sheet. See Note 17 – Fair Value Measurements for discussion of the methodology used to determine the fair value of the contingent earn-out payment.

^(b) Represents the non-cash settlement of accounts receivable due from JJE to the Company as of the acquisition date. Corresponding amount payable by JJE to the Company is not included in accounts payable assumed in the table above, and the amount was settled at fair value with no impact on the Consolidated Statement of Operations.

^(c) Represents the non-cash settlement of accounts receivable due from JJE to the Company as of the acquisition date. Corresponding amount payable by JJE to the Company is not included in accounts payable assumed in the table above, and the amount was settled at fair value with no impact on the Consolidated Statement of Operations.

^(d) Consists primarily of street sweepers, sewer cleaners, vacuum trucks and other maintenance equipment. Fair value was determined using a combination of a market-based approach and a cost-based approach. The specific valuation technique depended upon the nature of the asset or availability of relevant information. Under the market-based approach, an analysis of market conditions and transactions comparable to the subject asset being valued was performed, and fair value was determined where reliable and available data on comparable sales could be found. In

this context, fair value was determined by comparing recent sales of similar assets and adjusting these comparable sales based on factors such as age, condition and type of sale. Under the cost-based approach, the current replacement cost for the assets was calculated, using the direct method of the cost approach. In determining fair value under the cost approach, adjustments were made for physical, functional and economic factors affecting utility and value as they might apply.

(e) Represents the fair value assigned to the JJE trade name, which is considered to be an indefinite-lived intangible asset.

(f) The majority of goodwill, which is primarily attributable to synergies expected to result from combining JJE's operations with the Company's operations, is expected to be deductible for tax purposes.

As further explained in Note 17 – Fair Value Measurements, in the years ended December 31, 2018, 2017 and 2016, the Company recognized expenses of \$0.9 million, \$0.8 million and \$0.4 million, respectively, associated with the change in the fair value of the contingent consideration liability. In addition, in the years ended December 31, 2018, 2017 and 2016, the Company recognized expenses of \$0.2 million, \$0.2 million and \$0.1 million, respectively, in relation to the accretion of the discount on the deferred payment obligation. These expenses have been included as a component of Acquisition and integration-related expenses on the Consolidated Statement of Operations.

In connection with the acquisition of JJE, the Company entered into lease agreements for two facilities owned by affiliates of the sellers of JJE. Both agreements include an annual rent that is considered to be market-based, and are for an initial lease term of five years, with options to renew. Total rent paid under these agreements to the former shareholders of JJE, some of whom are now employees of the Company, was approximately \$0.3 million, \$0.4 million and \$0.2 million during the years ended December 31, 2018, 2017 and 2016, respectively. In addition, during the years ended December 31, 2018, 2017 and 2016, the Company's Environmental Solutions Group recorded net sales of \$1.7 million, \$0.7 million and \$1.7 million, respectively, relating to products sold to Ingenieria Y Servicios Orbitec SPA, an entity which is majority-owned by affiliates of the sellers of JJE.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

NOTE 4 — INVENTORIES

The following table summarizes the components of inventories:

(in millions)	2018	2017
Finished goods	\$78.3	\$74.3
Raw materials	66.3	52.6
Work in process	12.7	10.3
Total inventories	\$157.3	\$137.2

NOTE 5 — PROPERTIES AND EQUIPMENT, NET

The following table summarizes the components of properties and equipment, net:

(in millions)	2018	2017
Land	\$3.7	\$3.7
Buildings and improvements	35.8	34.7
Machinery and equipment	138.5	130.6
Total property and equipment, at cost	178.0	169.0
Less: Accumulated depreciation	116.0	108.9
Properties and equipment, net	\$62.0	\$60.1

In July 2008, the Company entered into sale-leaseback transactions for its Elgin and University Park, Illinois plant locations. Net proceeds received were \$35.8 million, resulting in a deferred gain of \$29.0 million. The deferred gain is being amortized over the 15-year life of the respective leases. The deferred gain balance was \$8.7 million and \$10.6 million at December 31, 2018 and 2017, respectively. Of these amounts, \$1.9 million and \$1.9 million, were included within Other current liabilities on the Consolidated Balance Sheets at December 31, 2018 and 2017, respectively. As discussed further in Note 19 – New Accounting Pronouncements (Issued But Not Yet Adopted), in connection with the Company’s adoption of the new lease accounting standard effective January 1, 2019, the remaining deferred gain balance of \$8.7 million will be recognized as a cumulative effect adjustment to opening retained earnings.

The Company leases certain facilities and equipment under operating leases, some of which contain options to renew. Total rental expense on all operating leases was \$8.8 million in 2018, \$8.5 million in 2017 and \$8.3 million in 2016. Sublease income and contingent rentals relating to operating leases were insignificant. At December 31, 2018, minimum future rental commitments under operating leases having non-cancelable lease terms in excess of one year aggregated \$34.3 million and were payable as follows: \$8.9 million in 2019, \$8.0 million in 2020, \$6.9 million in 2021, \$5.9 million in 2022, \$3.4 million in 2023 and \$1.2 million thereafter.

NOTE 6 — RENTAL EQUIPMENT, NET

The following table summarizes the components of rental equipment, net:

(in millions)	2018	2017
Rental equipment	\$126.6	\$107.2
Less: Accumulated depreciation	30.0	20.0
Rental equipment, net	\$96.6	\$87.2

Rental income associated with the Company's equipment rental activity, which is included as a component of Net sales on the Consolidated Statements of Operations, totaled \$41.8 million in 2018, \$31.6 million in 2017 and \$18.4 million in 2016.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

NOTE 7 — GOODWILL AND OTHER INTANGIBLE ASSETS

The following table summarizes the carrying amount of goodwill by segment:

(in millions)	Environmental Solutions	Safety & Security Systems	Total
Balance at December 31, 2016	\$ 127.2	\$ 109.3	\$236.5
Acquisitions	136.0	—	136.0
Translation adjustments	0.4	4.4	4.8
Balance at December 31, 2017	263.6	113.7	377.3
Translation adjustments	(0.4	) (1.8	) (2.2
Balance at December 31, 2018	\$ 263.2	\$ 111.9	\$375.1

The following table summarizes the gross carrying amount and accumulated amortization of intangible assets for each major class of intangible assets:

(in millions)	December 31, 2018			December 31, 2017		
	Gross Carrying Value	Accumulated Amortization	Net Carrying Value	Gross Carrying Value	Accumulated Amortization	Net Carrying Value
Definite-lived intangible assets:						
Customer relationships ^(a)	\$90.9	\$ (12.1	) \$ 78.8	\$90.9	\$ (4.6	) \$ 86.3
Other ^(a)	2.9	(1.3	) 1.6	2.9	(0.9	) 2.0
Total definite-lived intangible assets	93.8	(13.4	) 80.4	93.8	(5.5	) 88.3
Indefinite-lived intangible assets:						
Trade names	62.7	—	62.7	63.5	—	63.5
Total indefinite-lived intangible assets	62.7	—	62.7	63.5	—	63.5
Total intangible assets	\$156.5	\$ (13.4	) \$ 143.1	\$157.3	\$ (5.5	) \$ 151.8

Average useful life of customer relationships and other definite-lived intangible assets are estimated to be (a) approximately 12 years and 7 years, respectively. The average useful life across all definite-lived intangible assets is estimated to be approximately 12 years.

Amortization expense for the years ended December 31, 2018 and 2017 was \$8.0 million and \$4.8 million, respectively. Amortization expense for the year ended December 31, 2016 was immaterial.

The Company currently estimates that aggregate amortization expense will be approximately \$8.0 million in 2019, \$8.0 million in 2020, \$7.9 million in 2021, \$7.8 million in 2022, \$7.6 million in 2023 and \$41.0 million thereafter. Actual amounts of amortization may differ from estimated amounts due to additional intangible asset acquisitions, changes in foreign currency rates, impairment of intangible assets and other events.

NOTE 8 — DEBT

The following table summarizes the components of long-term debt and capital lease obligations:

(in millions)	2018	2017
Amended 2016 Credit Agreement	\$209.4	\$277.0
Capital lease obligations	0.7	0.7
Total long-term borrowings and capital lease obligations, including current portion	210.1	277.7
Less: Current capital lease obligations	0.2	0.3
Total long-term borrowings and capital lease obligations	\$209.9	\$277.4

As more fully described within Note 17 – Fair Value Measurements, the Company uses a three-level fair value hierarchy that prioritizes the inputs used to measure fair value. The fair value of long-term debt is based on interest rates that we believe are currently available to us for issuance of debt with similar terms and remaining maturities (Level 2 input).

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following table summarizes the carrying amounts and fair values of the Company's financial instruments:

(in millions)	2018		2017	
	Notional Amount	Fair Value	Notional Amount	Fair Value
Long-term borrowings ^(a)	210.1	210.1	277.7	277.7

^(a) Long-term borrowings includes current portions of long-term debt and current portions of capital lease obligations of \$0.2 million and \$0.3 million as of December 31, 2018 and 2017, respectively.

On January 27, 2016, the Company entered into an Amended and Restated Credit Agreement (the "2016 Credit Agreement"), by and among the Company and certain of its foreign subsidiaries (collectively, the "Borrowers"), Wells Fargo Bank, National Association, as administrative agent, swingline lender and issuing lender, JPMorgan Chase Bank, N.A. as syndication agent, KeyBank National Association, as documentation agent, Wells Fargo Securities, LLC and J.P. Morgan Securities LLC, as joint lead arrangers and joint bookrunners, and the other lenders and parties signatory thereto.

The 2016 Credit Agreement provided for a \$325.0 million revolving credit facility, maturing on January 27, 2021, with borrowings in the form of loans or letters of credit up to the aggregate availability under the facility, with a sub-limit of \$50.0 million for letters of credit.

On June 2, 2017, in anticipation of the TBEI acquisition, the Company executed an amendment to the 2016 Credit Agreement (as amended, the "Amended 2016 Credit Agreement"), which increased the borrowing capacity under the Amended 2016 Credit Agreement to \$400.0 million. In addition, the Amended 2016 Credit Agreement includes an accordion feature, whereby the Company may cause the commitments to increase by up to an additional \$75.0 million, subject to the approval of the applicable lenders providing such additional financing.

The Amended 2016 Credit Agreement allows for the Borrowers to borrow in denominations of U.S. Dollars, Canadian Dollars (up to a maximum of C\$100.0 million) or Euros (up to a maximum of €20.0 million). Borrowings under the Amended 2016 Credit Agreement may be used for working capital and general corporate purposes, including permitted acquisitions.

The Company's domestic subsidiaries provide guarantees for all obligations of the Borrowers under the Amended 2016 Credit Agreement, which is secured by a first priority security interest in all now or hereafter acquired domestic property and assets and the stock or other equity interests in each of the domestic subsidiaries and 65% of the outstanding voting capital stock of certain first-tier foreign subsidiaries, subject to certain exclusions.

Borrowings under the Amended 2016 Credit Agreement bear interest, at the Company's option, at a base rate or a LIBOR rate, plus, in each case, an applicable margin. The applicable margin ranges from 0.00% to 1.25% for base rate borrowings and 1.00% to 2.25% for LIBOR borrowings. The Company must also pay a commitment fee to the lenders ranging between 0.15% to 0.30% per annum on the unused portion of the \$400.0 million revolving credit facility along with other standard fees. Letter of credit fees are payable on outstanding letters of credit in an amount equal to the applicable LIBOR margin plus other customary fees.

The Company is subject to certain leverage ratio and interest coverage ratio financial covenants under the Amended 2016 Credit Agreement that are to be measured at each fiscal quarter-end. The Company was in compliance with all such covenants as of December 31, 2018. Although it has not been triggered by the Company, the Amended 2016 Credit Agreement also includes a “covenant holiday” period, which allows for the temporary increase of the minimum leverage ratio following the completion of a permitted acquisition, or a series of permitted acquisitions, when the total consideration exceeds a specified threshold. In addition, the Amended 2016 Credit Agreement includes customary negative covenants, subject to certain exceptions, restricting or limiting the Company’s and its subsidiaries’ ability to, among other things: (i) make non-ordinary course dispositions of assets, (ii) make certain fundamental business changes, such as merge, consolidate or enter into any similar combination, (iii) make restricted payments, including dividends and stock repurchases, (iv) incur indebtedness, (v) make certain loans and investments, (vi) create liens, (vii) transact with affiliates, (viii) enter into sale/leaseback transactions, (ix) make negative pledges and (x) modify subordinated debt documents.

Under the Amended 2016 Credit Agreement, restricted payments, including dividends and stock repurchases, shall be permitted if (i) the Company’s leverage ratio is less than or equal to 2.50, (ii) the Company is in compliance with all other financial covenants and (iii) there are no existing defaults under the Amended 2016 Credit Agreement. If its leverage ratio is more than 2.50, the Company is still permitted to fund (i) up to \$30.0 million of dividend payments, (ii) stock repurchases sufficient to offset dilution created by the issuance of equity as compensation to its officer, directors, employees and consultants and (iii) an incremental \$30.0 million of other cash payments.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The Amended 2016 Credit Agreement contains customary events of default. If an event of default occurs and is continuing, the Borrowers may be required immediately to repay all amounts outstanding under the Amended 2016 Credit Agreement and the commitments from the lenders may be terminated.

In connection with its debt refinancing in the year ended December 31, 2016, the Company repaid the remaining \$43.4 million of principal outstanding under the Company's March 13, 2013 Credit Agreement (the "2013 Credit Agreement") and wrote off approximately \$0.3 million of associated unamortized deferred financing fees. The Company incurred \$1.1 million of debt issuance costs in connection with the execution of the 2016 Credit Agreement. Such fees have been deferred and are being amortized over the five-year term.

As of December 31, 2018, there was \$209.4 million of cash drawn and \$11.3 million of undrawn letters of credit under the Amended 2016 Credit Agreement, with \$179.3 million of net availability for borrowings.

For the year ended December 31, 2018, gross payments and gross borrowings under the Amended 2016 Credit Agreement were \$70.1 million and \$8.0 million, respectively. For the year ended December 31, 2017, gross borrowings and gross payments under the 2016 Credit Agreement and the Amended 2016 Credit Agreement were \$262.7 million and \$53.6 million, respectively. For the year ended December 31, 2016, gross borrowings and gross payments under the 2016 Credit Agreement were \$69.8 million and \$5.0 million, respectively.

Aggregate maturities of total borrowings due amount to approximately \$0.2 million in 2019, \$0.2 million in 2020, \$209.6 million in 2021 and \$0.1 million in 2022. The weighted average interest rate on long-term borrowings was 3.3% at December 31, 2018.

The Company paid interest of \$8.7 million in 2018, \$6.6 million in 2017 and \$1.1 million in 2016.

Interest Rate Swap

On June 2, 2017, the Company entered into an interest rate swap (the "Swap") with a notional amount of \$150.0 million, as a means of fixing the floating interest rate component on \$150.0 million of its variable-rate debt. The Swap is designated as a cash flow hedge, with a termination date of June 2, 2020. As a result of the application of hedge accounting treatment, all unrealized gains and losses related to the derivative instrument are recorded in Accumulated other comprehensive loss and are reclassified into operations in the same period in which the hedged transaction affects earnings. Hedge effectiveness is tested quarterly. We do not use derivative instruments for trading or speculative purposes.

As more fully described within Note 17 – Fair Value Measurements, the Company uses a three-level fair value hierarchy that prioritizes the inputs used to measure fair value. The fair value of the Swap is derived from a discounted cash flow analysis based on the terms of the contract and the interest rate curve (Level 2 inputs) and measured on a recurring basis in our Consolidated Balance Sheets. At December 31, 2018 and 2017, the fair value of the Swap, included in Deferred charges and other assets on the Consolidated Balance Sheets, was \$2.0 million and \$1.6 million, respectively, and no ineffectiveness was recorded. During the years ended December 31, 2018 and 2017, unrealized pre-tax gains of \$0.4 million and \$1.6 million, respectively, were recorded in Accumulated other comprehensive loss.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

NOTE 9 — INCOME TAXES

The following table summarizes the income tax expense from continuing operations:

(in millions)	2018	2017	2016
Current tax expense (benefit):			
Federal	\$17.8	\$12.0	\$7.0
Foreign	(0.1)	0.8	0.6
State and local	5.7	2.9	2.0
Total current tax expense	23.4	15.7	9.6
Deferred tax expense (benefit):			
Federal	0.6	(15.7)	8.4
Foreign	(6.5)	0.8	(0.7)
State and local	0.4	(0.3)	0.1
Total deferred tax (benefit) expense	(5.5)	(15.2)	7.8
Total income tax expense	\$17.9	\$0.5	\$17.4

The following table summarizes the differences between the statutory federal income tax rate and the effective income tax rate from continuing operations:

	2018	2017	2016
Statutory federal income tax rate	21.0 %	35.0 %	35.0 %
State income taxes, net of federal tax benefit	4.5	4.3	3.6
Remeasurement of deferred taxes, associated with 2017 Tax Act	—	(37.6)	—
Valuation allowance	—	3.6	(3.7)
Domestic production deduction	—	(2.3)	(2.4)
Tax planning benefits, excluding valuation allowance effects	(8.1)	—	—
Tax reserves	(0.3)	0.1	(1.0)
Tax credits	(0.3)	(0.9)	(0.8)
Foreign tax rate effects	0.3	(0.5)	0.8
Other, net	(1.1)	(0.9)	(0.9)
Effective income tax rate	16.0 %	0.8 %	30.6 %

The following table summarizes income (loss) before income taxes from continuing operations:

(in millions)	2018	2017	2016
U.S.	\$100.6	\$55.7	\$57.7
Non-U.S.	11.0	5.3	(0.9)
Income before income taxes	\$111.6	\$61.0	\$56.8

Summary

The Company recognized income tax expense of \$17.9 million for the year ended December 31, 2018, compared to \$0.5 million for the year ended December 31, 2017. The increase in income tax expense was primarily due to higher

earnings, and the impact of certain special tax items in the prior year, which did not repeat in 2018. In addition, during the year ended December 31, 2018, the Company recognized a tax benefit of \$8.6 million associated with the completion of a tax planning strategy in Spain. Tax expense for the year ended December 31, 2017 was lower than in 2018, largely due to the recognition of a \$23.0 million net tax benefit associated with the revaluation of the Company's net deferred tax liabilities in the U.S. following the reduction of the federal corporate tax rate included in the 2017 Tax Act. This benefit was partially offset by a \$2.2 million net increase in valuation allowance, inclusive of a \$3.0 million valuation allowance recorded against the Company's foreign tax credits as a result of the enactment of the 2017 Tax Act, the recognition of \$0.6 million of additional tax expense associated with a change in the state tax rate in Illinois, and additional taxes resulting from higher pre-tax earnings. The Company's effective tax rate for the year ended December 31, 2018 was 16.0%, compared to 0.8% in 2017. The 2018 effective tax rate

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

included the effects of the benefit from the tax planning strategy, whereas the 2017 effective tax rate included the aforementioned impacts resulting from the 2017 Tax Act.

The Company recognized income tax expense of \$0.5 million for the year ended December 31, 2017, compared to \$17.4 million for the year ended December 31, 2016. The decrease in expense was primarily due to the recognition of a \$23.0 million net tax benefit associated with the revaluation of the Company's net deferred tax liabilities in the U.S. following the reduction of the federal corporate tax rate included in the 2017 Tax Act. This decrease was partially offset by a \$2.2 million net increase in valuation allowance, inclusive of a \$3.0 million valuation allowance recorded against the Company's foreign tax credits as a result of the enactment of the 2017 Tax Act, the recognition of \$0.6 million of additional tax expense associated with a change in the state tax rate in Illinois, and additional taxes resulting from higher pre-tax earnings. The Company's effective tax rate for the year ended December 31, 2017 was 0.8%, compared to 30.6% in 2016. The 2017 effective tax rate included the aforementioned impacts resulting from the 2017 Tax Act. The effective tax rate for 2016 included a \$2.2 million net benefit from valuation allowance changes, consisting of a \$3.5 million benefit associated with the release of valuation allowance in Canada, offset by \$1.3 million of expense recognized in connection with establishing a valuation allowance against net deferred tax assets in the U.K.

The Company paid income taxes of \$21.6 million in 2018, \$13.9 million in 2017 and \$13.3 million in 2016.

Impact of the 2017 Tax Act

In December 2017, the 2017 Tax Act was enacted. Among its provisions, the 2017 Tax Act reduces the U.S. federal corporate tax rate from 35% to 21% (effective in 2018), required companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred and created new taxes on certain foreign sourced earnings, including a new minimum tax on Global Intangible Low-Taxed Income ("GILTI").

The Company accounts for income taxes in accordance with ASC 740, Income Taxes, which requires that the effect of a change in tax rates on deferred tax assets and liabilities be recognized in the period the tax rate change was enacted. As a result of the 2017 Tax Act, the Company remeasured its U.S. deferred tax assets and liabilities at the lower rate, recording a net tax benefit of \$23.0 million as a component of Income tax expense on the Consolidated Statement of Operations for the year ended December 31, 2017.

In addition, the 2017 Tax Act moved the U.S. from a worldwide system of taxation to a territorial system and changed the rules that enabled taxpayers to generate foreign source income related to export sales. As a result of these changes, the Company concluded that it was not "more likely than not" that it could utilize its existing foreign tax credits within the applicable carryforward period and recognized a \$3.0 million valuation allowance was recorded against the Company's foreign tax credits as of December 31, 2017.

The 2017 Tax Act also provides a one-time "transition tax" on untaxed post-1986 accumulated earnings and profits ("E&P") of a company's controlled foreign corporations ("CFC") determined as of November 2, 2017 or December 31, 2017 (whichever date on which there is more deferred E&P). Cash and cash equivalents are taxed at an effective rate of 15.5% and earnings in excess of the cash position are taxed at an effective rate of 8%. The 2017 Tax Act permits the netting of positive earnings of one CFC against deficits of others. At both November 2, 2017 and December 31,

2017, the accumulated undistributed earnings of the Company's foreign subsidiaries aggregate to an overall E&P deficit. Therefore, the Company did not have a transition tax liability under the provisions of the 2017 Tax Act. As of December 31, 2018, the Company continues to assert that its undistributed earnings of certain foreign subsidiaries are indefinitely reinvested.

Due to the complexities of implementing the provisions of the 2017 Tax Act, the SEC staff issued Staff Accounting Bulletin No. 118 ("SAB 118"), which provides guidance on the accounting for the tax effects of the 2017 Tax Act and permits a measurement period not to exceed one year from the enactment date for companies to complete the required analyses and accounting. The consolidated financial statements for the year ended December 31, 2017 included the Company's provisional estimates of the impact of the 2017 Tax Act, in accordance with SAB 118. The SAB 118 measurement period ended during the fourth quarter of 2018 and the Company had no significant measurement period adjustments. Additionally, the Company completed its assessment of GILTI and has established a policy to account for this tax as a period expense in the year it is incurred.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Deferred Taxes

The following table summarizes deferred income tax assets and liabilities of the Company's continuing operations:
(in millions)

	2018	2017
Deferred tax assets:		
Property, plant and equipment	\$1.9	\$1.7
Accrued expenses	27.3	24.0
Stock based compensation	3.5	2.6
Net operating loss, research and development and foreign tax credit carryforwards	25.8	22.6
Goodwill and intangibles	0.9	0.4
Pension benefits	20.2	22.7
Other	—	0.8
Gross deferred tax assets	79.6	74.8
Valuation allowance	(9.4)	(10.6)
Total deferred tax assets	70.2	64.2
Deferred tax liabilities:		
Property, plant and equipment	(17.9)	(11.3)
Pension benefits	(10.3)	(13.5)
Goodwill and intangibles	(74.6)	(77.1)
Other	(1.1)	(1.2)
Gross deferred tax liabilities	(103.9)	(103.1)
Net deferred tax liabilities	\$(33.7)	\$(38.9)

The deferred tax asset for tax loss carryforwards at December 31, 2018 includes federal net operating loss carryforwards of \$0.5 million, which will begin to expire in 2027, state net operating loss carryforwards of \$7.3 million, which will begin to expire in 2019, and foreign net operating loss carryforwards of \$13.8 million, which will begin to expire in 2025. The deferred tax asset for tax credit carryforwards at December 31, 2018 includes U.S. research tax credit carryforwards of \$1.1 million, which will begin to expire in 2019 and U.S. foreign tax credits of \$3.1 million, which will begin to expire in 2023.

The deferred tax asset for tax loss and tax credit carryforwards at December 31, 2017, included federal net operating loss carryforwards of \$1.1 million, state net operating loss carryforwards of \$8.3 million, foreign net operating loss carryforwards of \$9.1 million, U.S. foreign tax credits of \$3.0 million, and U.S. research tax credit carryforwards of \$1.1 million.

The \$70.2 million of deferred tax assets at December 31, 2018, for which no valuation allowance is recorded, is anticipated to be realized through future taxable income or the future reversal of existing taxable temporary differences recorded as deferred tax liabilities at December 31, 2018. Should the Company determine that it would not be able to realize its remaining deferred tax assets in the future, an adjustment to the valuation allowance would be recorded in the period such determination is made.

Valuation Allowances

ASC 740, Income Taxes, also requires that the future realization of deferred tax assets depends on the existence of sufficient taxable income in future periods. Possible sources of taxable income include taxable income in carryback periods, the future reversal of existing taxable temporary differences recorded as a deferred tax liability, tax-planning strategies that generate future income or gains in excess of anticipated losses in the carryforward period and projected future taxable income. If, based upon all available evidence, both positive and negative, it is more likely than not such deferred tax assets will not be realized, a valuation allowance is recorded. Significant weight is given to positive and negative evidence that is objectively verifiable. A company's three-year cumulative loss position is significant negative evidence in considering whether deferred tax assets are realizable and the accounting guidance restricts the amount of reliance the Company can place on projected taxable income to support the recovery of the deferred tax assets.

We continually evaluate the need to maintain a valuation allowance for deferred tax assets based on our assessment of whether it is more likely than not that deferred tax benefits will be realized through the generation of future taxable income. Appropriate consideration is given to all available evidence, both positive and negative, in assessing the need for a valuation allowance.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

During the year ended December 31, 2017, the Company determined that \$0.8 million of valuation allowance, previously recorded against state deferred tax assets, could be released primarily as a result of future taxable income expected to be generated in certain states following the TBEI acquisition.

At December 31, 2018, the total valuation allowance recorded against the Company's deferred tax assets was \$9.4 million, comprised of a \$5.3 million valuation allowance recorded against state net operating loss carryforwards, a \$1.0 million valuation allowance recorded against foreign net deferred tax assets, inclusive of a \$0.8 million valuation allowance against net deferred tax assets in the U.K., and a \$3.1 million valuation allowance recorded against the Company's foreign tax credits, primarily as a result of the 2017 Tax Act.

Unrecognized Tax Benefits

The following table summarizes the activity related to the Company's unrecognized tax benefits:

(in millions)	2018	2017	2016
Balance at January 1	\$1.9	\$1.8	\$2.2
Increases related to current year tax	0.2	0.2	0.1
Decreases due to lapse of statute of limitations	(0.5)	(0.1)	(0.5)
Balance at December 31	\$1.6	\$1.9	\$1.8

The Company's accounting policy is to recognize interest and penalties related to income tax matters in income tax expense. At December 31, 2018 and 2017, accruals for interest and penalties amounting to \$0.6 million and \$0.6 million, respectively, are included in the Consolidated Balance Sheets but are not included in the table above. At December 31, 2018 and 2017, reserves for unrecognized tax benefits, including interest and penalties, of \$2.1 million and \$2.2 million, respectively, were included within Other long-term liabilities on the Consolidated Balance Sheets. At December 31, 2018 and 2017, unrecognized tax benefits of \$0.1 million and \$0.3 million, respectively, were included as a component of Deferred tax liabilities on the Consolidated Balance Sheets.

All of the unrecognized tax benefits of \$1.6 million and \$1.9 million at December 31, 2018 and 2017, respectively, would impact our annual effective tax rate, if recognized. We do not expect any significant change to our unrecognized tax benefits as a result of potential expiration of statute of limitations or settlements with tax authorities within the next twelve months.

Status of Tax Returns

We file U.S., state and foreign income tax returns in jurisdictions with varying statutes of limitations. The 2015 through 2017 tax years generally remain subject to examination by federal tax authorities, whereas the 2014 through 2017 tax years generally remain subject to examination by most state tax authorities. In significant foreign jurisdictions, the tax years from 2014 through 2017 generally remain subject to examination by their respective tax authorities.

NOTE 10 — PENSIONS

As discussed in Note 1 – Summary of Significant Accounting Policies, the Company adopted the guidance in ASU 2017-07 effective January 1, 2018 following the retrospective method of adoption. The Consolidated Statements of Operations presented herein have been recast to present components of net periodic pension expense, other than

service cost, as a component of Other expense (income), net or Pension settlement charges, as applicable.

The Company and its subsidiaries sponsor two defined benefit pension plans covering certain salaried and hourly employees. These plans have been closed to new participants for a number of years. Benefits under these plans are primarily based on final average compensation and years of service as defined within the provisions of the individual plans. As a result of plan amendments, the latest of which was in 2008, the only new benefits that were being accrued through the end of 2016 were salary increases for a limited group of participants. Those benefits ceased at the end of 2016, at which point all existing plans became fully frozen.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

In October 2018, the U.K. High Court ruled that certain formulas used to calculate guaranteed minimum pension (“GMP”) benefits violated gender-pay equality laws. The Company is currently evaluating the impact of the ruling on its non-U.S. benefit plan’s GMP benefit formulas and monitoring for additional regulatory and interpretive developments. While the non-U.S. benefit plan has not yet been amended to address the ruling, the Company has recognized the estimated impact, resulting in a \$2.6 million increase to the benefit obligation with a corresponding adjustment to Prior service cost within Accumulated other comprehensive loss as of December 31, 2018. The prior service costs will be amortized into net periodic benefit cost over the remaining average life expectancy of plan participants.

In September 2017, the Company executed an amendment to its U.S. defined benefit pension plan, which enabled the Company to announce a limited-time voluntary lump-sum pension offering to eligible, terminated, vested plan participants. In connection with the offering, 516 individuals elected to receive a lump-sum settlement payment. In the aggregate, the Company paid a total of \$13.7 million in lump-sum benefit payments during the year ended December 31, 2017, using assets of the plan. As total benefit payments during the year ended December 31, 2017 exceeded the sum of the service and interest cost, the Company was required to measure the liabilities of the benefit plans and recognize a settlement charge of \$6.1 million, in accordance with ASC 715, Compensation - Retirement Benefits. The following table summarizes net periodic pension expense (benefit) for the U.S. and non-U.S. benefit plans:

(in millions)	U.S. Benefit Plan			Non-U.S. Benefit Plan		
	2018	2017	2016	2018	2017	2016
Company-sponsored plans:						
Service cost	\$—	\$—	\$—	\$0.2	\$0.2	\$0.2
Interest cost	6.4	7.6	7.8	1.3	1.4	1.8
Expected return on plan assets	(8.7)	(9.6)	(10.3)	(2.2)	(2.1)	(2.4)
Amortization of actuarial loss	3.0	2.5	5.6	0.6	0.6	0.6
Settlement charge recognized	—	6.1	—	—	—	—
Net periodic pension expense (benefit)	\$0.7	\$6.6	\$3.1	\$(0.1)	\$0.1	\$0.2

The following table summarizes the weighted-average assumptions used in determining pension costs:

	U.S. Benefit Plan			Non-U.S. Benefit Plan		
	2018	2017	2016	2018	2017	2016
Discount rate	3.7%	4.3%	4.6%	2.5 %	2.6 %	3.7 %
Expected long-term rate of return on plan assets	7.0%	7.1%	7.5%	4.2 %	4.2 %	4.9 %

The following table summarizes the changes in the projected benefit obligation and plan assets:

(in millions)	U.S. Benefit Plan		Non-U.S. Benefit Plan	
	2018	2017	2018	2017
Benefit obligation, beginning of year	\$179.0	\$180.6	\$ 54.7	\$ 51.7
Service cost	—	—	0.2	0.2
Interest cost	6.4	7.6	1.3	1.4

Actuarial (gain) loss	(13.9)	12.9	(2.2)	(0.1)
Benefits and expenses paid	(9.9)	(8.4)	(3.8)	(3.3)
Settlement payments	—	(13.7)	—	—
Amendments ^(a)	—	—	2.6	—
Foreign currency translation	—	—	(3.0)	4.8
Benefit obligation, end of year	\$ 161.6	\$ 179.0	\$ 49.8	\$ 54.7
Accumulated benefit obligation, end of year	\$ 161.6	\$ 179.0	\$ 49.8	\$ 54.7

While the non-U.S. benefit plan has not yet been amended, this component of the change to the benefit obligation (a) of the non-U.S. benefit plan during the year ended December 31, 2018 represents the estimated impact of the U.K. High Court ruling, as described above.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following table summarizes the weighted-average assumptions used in determining benefit obligations:

	U.S. Benefit Plan		Non-U.S. Benefit Plan	
	2018	2017	2018	2017
Discount rate	4.4 %	3.7 %	2.8 %	2.5 %

The following summarizes the changes in the fair value of plan assets:

	U.S. Benefit Plan		Non-U.S. Benefit Plan	
(in millions)	2018	2017	2018	2017
Fair value of plan assets, beginning of year	\$131.7	\$131.1	\$ 54.7	\$ 48.5
Actual (loss) return on plan assets ^(a)	(10.0)	17.7	(1.6)	3.9
Company contribution	7.0	5.0	1.3	0.9
Benefits and expenses paid	(9.9)	(8.4)	(3.8)	(3.3)
Settlement payments	—	(13.7)	—	—
Foreign currency translation	—	—	(2.9)	4.7
Fair value of plan assets, end of year	\$118.8	\$131.7	\$ 47.7	\$ 54.7

^(a) Actual (loss) return on plan assets of the U.S. benefit plan for the years ended December 31, 2018 and 2017, was net of fees, commissions and other expenses paid from plan assets of \$1.8 million and \$2.2 million, respectively. As more fully described within Note 17 – Fair Value Measurements, the Company uses a three-level fair value hierarchy that prioritizes the inputs used to measure fair value.

Following is a description of the valuation methodologies used for assets measured at fair value for the U.S. benefit plan:

Cash and cash equivalents are comprised of cash on deposit and a money market fund, that invests principally in short-term instruments. The money-market fund is valued at the net asset value (“NAV”) of the shares in the fund. Equity investments represent domestic and foreign securities, including common stock, which are publicly traded on active exchanges and are valued based on quoted market prices. Certain equity securities, which are valued using a model that takes the underlying security’s “best” price, divides it by the applicable exchange rate and multiplies the result by a depository receipt factor, are categorized within Level 2 of the fair value hierarchy.

Fixed income investments include corporate bonds, asset-backed securities and treasury bonds. Corporate bonds are valued using pricing models that include bids provided by brokers or dealers, benchmark yields, base spreads and reported trades. Asset-backed securities are valued using models with readily observable data as inputs. Treasury bonds are valued based on quoted market prices in active markets.

Mutual funds are valued at the NAV, based on quoted market prices in active markets, of shares held by the plan at year end.

Real estate investments include public real estate investment trusts (“REIT”) and exchange traded REIT funds, which are publicly traded on active exchanges and are valued based on quoted market prices.

Following is a description of the valuation methodologies used for assets measured at fair value for the non-U.S. benefit plan:

Equity investments represent domestic and foreign securities, which are publicly traded on active exchanges and are valued based on quoted market prices. The inputs used to value certain other non-U.S. investments in equity securities both in the U.K. and other overseas markets are based on observable market information consistent with Level 2 of the fair value hierarchy inputs.

Fixed income investments include treasury securities, which are valued based on quoted market prices in active markets, and corporate bonds which are either valued based on quoted market prices in active markets or other readily observable market data.

The methods described above may produce a fair value calculation that may not be indicative of net realizable value or reflective of future fair values. Furthermore, while the Company believes its valuation methods are appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following summarizes the Company's pension assets in a three-tier fair value hierarchy for its benefit plans:

(in millions)	U. S. Benefit Plan							
	2018				2017			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Cash and cash equivalents	\$4.8	\$ —	\$ —	—\$4.8	\$4.2	\$ —	\$ —	—\$4.2
Equity securities:								
U.S. Large Cap	36.0	—	—	36.0	39.7	—	—	39.7
U.S. Small and Mid Cap	19.6	—	—	19.6	18.5	—	—	18.5
Developed international	8.9	6.8	—	15.7	12.3	7.1	—	19.4
Emerging markets	10.1	0.8	—	10.9	12.1	0.8	—	12.9
Fixed income:								
Government securities	8.2	—	—	8.2	6.6	—	—	6.6
Asset-backed securities	—	12.5	—	12.5	—	11.7	—	11.7
Corporate bonds	—	10.6	—	10.6	—	13.9	—	13.9
Other investments:								
Mutual funds	—	—	—	—	1.4	—	—	1.4
Real estate	0.3	—	—	0.3	3.1	—	—	3.1
Total assets at fair value ^(a)	\$87.9	\$ 30.7	\$ —	—\$118.6	\$97.9	\$ 33.5	\$ —	—\$131.4

^(a) Total assets at fair value in the table above exclude a net receivable of \$0.2 million and \$0.3 million at December 31, 2018 and 2017, respectively.

(in millions)	Non-U. S. Benefit Plan							
	2018				2017			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Cash	\$0.1	\$ —	\$ —	—\$0.1	\$0.8	\$ —	\$ —	—\$0.8
Equity securities	—	36.4	—	36.4	—	41.1	—	41.1
Fixed income:								
Government securities	2.8	—	—	2.8	3.6	—	—	3.6
Corporate bonds	6.2	2.2	—	8.4	6.8	2.4	—	9.2
Total assets at fair value	\$9.1	\$ 38.6	\$ —	—\$47.7	\$11.2	\$ 43.5	\$ —	—\$54.7

The Company maintains a structured derisking investment strategy for the U.S. pension plan to improve alignment of assets and liabilities that includes: (i) maintaining a diversified portfolio that can provide a near-term weighted-average target return of approximately 7.0% or more, (ii) maintaining liquidity to meet obligations and (iii) prudently managing administrative and management costs. The target asset allocations for the U.S. pension plan are (i) between 53% and 73% equity securities, (ii) between 25% and 45% fixed income securities and (iii) between 0% and 20% in cash and cash equivalents. Other investments may include real estate investments and mutual funds

investing in real estate, commodities or hedge funds.

Plan assets for the non-U.S. benefit plans consist principally of a diversified portfolio of equity securities, U.K. government securities, corporate bonds and debt securities. The target asset allocations for the non-U.S. benefit plan assets are between 65% and 75% equity securities and between 25% and 35% debt securities.

63

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following summarizes the funded status of the Company-sponsored plans:

(in millions)	U.S. Benefit Plan		Non-U.S. Benefit Plan	
	2018	2017	2018	2017
Fair value of plan assets, end of year	\$118.8	\$131.7	\$ 47.7	\$ 54.7
Benefit obligation, end of year	161.6	179.0	49.8	54.7
Funded status, end of year	\$(42.8) \$(47.3)		\$ (2.1) \$ —	

The following summarizes the amounts recognized within our Consolidated Balance Sheets:

(in millions)	U.S. Benefit Plan		Non-U.S. Benefit Plan	
	2018	2017	2018	2017
Amounts recognized in Total liabilities include:				
Long-term pension and other post-retirement benefit liabilities	\$42.8	\$47.3	\$ 2.1	\$ —
Net liability recorded	\$42.8	\$47.3	\$ 2.1	\$ —
Amounts recognized in Accumulated other comprehensive loss include:				
Net actuarial loss	\$81.9	\$80.2	\$ 17.8	\$ 17.8
Prior service cost	\$—	\$—	\$ 2.5	\$ —
Net amount recognized, pre-tax	\$81.9	\$80.2	\$ 20.3	\$ 17.8

As a result of the U.S. benefit plan becoming fully frozen at the end of 2016, all plan participants are now considered to be inactive. Effective in 2017, the actuarial loss associated with the U.S. benefit plan that is included in Accumulated other comprehensive loss is being amortized into net periodic benefit cost over the remaining average life expectancy of plan participants, as opposed to over the remaining average service period. The same methodology is also being applied to the U.K. benefit plan, which has been fully frozen for a number of years. The Company expects \$3.3 million of the net actuarial loss and \$0.1 million of the prior service cost to be amortized from Accumulated other comprehensive loss into net periodic benefit cost in 2019.

In 2019, the Company currently expects to contribute up to \$1.3 million to the non-U.S. benefit plan, but does not currently expect to make any contributions to the U.S. benefit plan. Future contributions to the plans will be based on such factors as annual service cost, the financial return on plan assets, interest rate movements that affect discount rates applied to plan liabilities and the value of benefit payments made.

The following summarizes the benefits expected to be paid under the Company's defined benefit plans in each of the next five years, and in aggregate for the five years thereafter:

(in millions)	U.S. Benefit Plan	Non-U.S. Benefit Plan
2019	\$ 9.2	\$ 2.5
2020	9.6	2.6
2021	9.8	2.7
2022	10.2	2.7

2023	10.6	2.9
2024-2028	54.0	15.9

The Company also sponsors a defined contribution retirement plan covering a majority of its employees. Participation is via automatic enrollment and employees may elect to opt out of the plan. Company contributions to the plan are based on employee age and years of service, as well as the percentage of employee contributions. The cost of these plans was \$7.2 million in 2018, \$6.9 million in 2017 and \$6.9 million in 2016.

64

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Multi-Employer Pension Plans

The Company also participates in two multi-employer pension plans that provide defined benefits to employees under U.S. collective bargaining agreements, as follows:

Pension Fund	EIN/Pension Plan Number	Pension Protection Act Zone Status		FIP/RP Status Pending/ Implemented ^(a)	Surcharge Imposed	Expiration of Collective Bargaining Agreement
		2018	2017			
IAM National Pension Fund ^(b)	51-6031295/002	Green	Green	No	No	5/31/2021
Sheet Metal Worker's National Pension Fund ^(b)	52-6112463/001	Yellow	Yellow	FIP Implemented	No	6/27/2020

(a) Indicates whether the plan has a financial improvement plan ("FIP") or a rehabilitation plan ("RP") which is either pending or has been implemented.

(b) The plans' year-end to which the zone status relates is December 31, 2017 and 2016.

Contributions to these plans totaled \$0.2 million, \$0.2 million and \$0.1 million for 2018, 2017 and 2016, respectively. The Company's contributions do not represent more than 5% of the total contributions to the plans as indicated in their most recently available annual reports dated December 31, 2017.

The risks of participating in a multi-employer pension plan are different from a single-employer plan in that (i) assets contributed to the multi-employer plan by one employer may be used to provide benefits to employees of other participating employers; (ii) if a participating employer stops contributing to the plan, the unfunded obligations of the plan may be borne by the remaining participating employers; and (iii) if the Company chooses to stop participating in the multi-employer pension plan, the Company may be required to pay the plan an amount based on the unfunded status of the plan, referred to as a withdrawal liability.

NOTE 11 — COMMITMENTS AND CONTINGENCIES

Financial Commitments

The Company provides indemnifications and other guarantees in the ordinary course of business, the terms of which range in duration and often are not explicitly defined. Specifically, the Company is occasionally required to provide letters of credit and bid and performance bonds to various customers, principally to act as security for retention levels related to casualty insurance policies and to guarantee the performance of subsidiaries that engage in export and domestic transactions. At December 31, 2018, the Company had outstanding performance and financial standby letters of credit, as well as outstanding bid and performance bonds, aggregating to \$18.2 million. If any such letters of credit or bonds are called, the Company would be obligated to reimburse the issuer of the letter of credit or bond. The Company believes the likelihood of any currently outstanding letter of credit or bond being called is remote.

The Company has transactions involving the sale of equipment to certain of its customers which include (i) guarantees to repurchase the equipment for a fixed price at a future date and (ii) guarantees to repurchase the equipment from the

third-party lender in the event of default by the customer. As of December 31, 2018, the single year and maximum potential cash payments the Company could be required to make to repurchase equipment under these agreements were \$3.5 million and 4.3 million, respectively. The Company's risk under these repurchase arrangements would be partially mitigated by the value of the products repurchased as part of the transaction. Further, pursuant to the terms of the June 3, 2016 acquisition of substantially all of the assets and operations of JJE, the former owners of JJE have agreed to reimburse the Company for certain losses incurred resulting from the requirement to repurchase equipment that was sold prior to the acquisition date. Any such reimbursement could be withheld from the C\$8.0 million deferred payment to be made to the former owners of JJE on the third anniversary of the acquisition date. Historical cash requirements and losses associated with these obligations have not been significant, but could increase if customer defaults exceed current expectations.

Product Warranties

The Company issues product performance warranties to customers with the sale of its products. The specific terms and conditions of these warranties vary depending upon the product sold and country in which the Company does business, with warranty periods generally ranging from one to five years. The Company estimates the costs that may be incurred under its basic limited warranty and records a liability in the amount of such costs at the time the sale of the related product is recognized. Factors that affect the Company's warranty liability include (i) the number of units under warranty, (ii) historical and anticipated rates of warranty claims and (iii) costs per claim. The Company periodically assesses the adequacy of its recorded warranty liabilities and adjusts the amounts as necessary.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following table summarizes the changes in the Company's warranty liabilities:

(in millions)	2018	2017
Balance at January 1	\$8.4	\$6.4
Provisions to expense	7.8	6.6
Acquisitions	—	1.7
Payments	(6.4)	(6.3)
Balance at December 31	\$9.8	\$8.4

As of December 31, 2018 and 2017, an estimated liability was recorded within the Environmental Solutions Group in connection with a specific warranty matter. It is reasonably possible that the Company's estimate may change in the near term as more information becomes available; however, the ultimate resolution of this matter is not expected to have a material adverse effect on the Company's results of operations, financial position or liquidity.

Environmental Liabilities

In May 2012, the Company sold a facility in Pearland, Texas. The facility was previously used by the Company's discontinued Pauluhn business, which manufactured marine, offshore and industrial lighting products. The site is in the process of remediation, and it is probable that the site will incur future costs. As such, as of December 31, 2018 and 2017, environmental remediation reserves of \$0.4 million and \$0.5 million, respectively, have been included in liabilities of discontinued operations on the Consolidated Balance Sheets. The recorded reserves are based on an undiscounted estimate of the range of costs to remediate the site, depending upon the remediation approach and other factors. The Company's estimate may change in the near-term as more information becomes available; however, the costs are not expected to have a material adverse effect on the Company's results of operations, financial position or cash flow.

NOTE 12 — LEGAL PROCEEDINGS

The Company is subject to various claims, including pending and possible legal actions for product liability and other damages, and other matters arising in the ordinary course of the Company's business. On a quarterly basis, the Company reviews uninsured material legal claims against the Company and accrues for the costs of such claims as appropriate in the exercise of management's best judgment and experience. However, due to a lack of factual information available to the Company about a claim, or the procedural stage of a claim, it may not be possible for the Company to reasonably assess either the probability of a favorable or unfavorable outcome of the claim or to reasonably estimate the amount of loss should there be an unfavorable outcome. Therefore, for many claims, the Company cannot reasonably estimate a range of loss.

The Company believes, based on current knowledge and after consultation with counsel, that the outcome of such claims and actions will not have a material adverse effect on the Company's results of operations or financial condition. However, in the event of unexpected future developments, it is possible that the ultimate resolution of such matters, if unfavorable, could have a material adverse effect on the Company's results of operations, financial condition or cash flow.

Hearing Loss Litigation

The Company has been sued for monetary damages by firefighters who claim that exposure to the Company's sirens has impaired their hearing and that the sirens are therefore defective. There were 33 cases filed during the period of 1999 through 2004, involving a total of 2,443 plaintiffs, in the Circuit Court of Cook County, Illinois. These cases involved more than 1,800 firefighter plaintiffs from locations outside of Chicago. In 2009, six additional cases were filed in Cook County, involving 299 Pennsylvania firefighter plaintiffs. During 2013, another case was filed in Cook County involving 74 Pennsylvania firefighter plaintiffs.

The trial of the first 27 of these plaintiffs' claims occurred in 2008, whereby a Cook County jury returned a unanimous verdict in favor of the Company.

An additional 40 Chicago firefighter plaintiffs were selected for trial in 2009. Plaintiffs' counsel later moved to reduce the number of plaintiffs from 40 to nine. The trial for these nine plaintiffs concluded with a verdict against the Company and for the plaintiffs in varying amounts totaling \$0.4 million. The Company appealed this verdict. On September 13, 2012, the Illinois Appellate Court rejected this appeal. The Company thereafter filed a petition for rehearing with the Illinois Appellate Court, which was denied on February 7, 2013. The Company sought further review by filing a petition for leave to appeal with the Illinois Supreme Court on March 14, 2013. On May 29, 2013, the Illinois Supreme Court issued a summary order declining to

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

accept review of this case. On July 1, 2013, the Company satisfied the judgments entered for these plaintiffs, which has resulted in final dismissal of these cases.

A third consolidated trial involving eight Chicago firefighter plaintiffs occurred during November 2011. The jury returned a unanimous verdict in favor of the Company at the conclusion of this trial.

Following this trial, on March 12, 2012 the trial court entered an order certifying a class of the remaining Chicago Fire Department firefighter plaintiffs for trial on the sole issue of whether the Company's sirens were defective and unreasonably dangerous. The Company petitioned the Illinois Appellate Court for interlocutory appeal of this ruling.

On May 17, 2012, the Illinois Appellate Court accepted the Company's petition. On June 8, 2012, plaintiffs moved to dismiss the appeal, agreeing with the Company that the trial court had erred in certifying a class action trial in this matter. Pursuant to plaintiffs' motion, the Illinois Appellate Court reversed the trial court's certification order.

Thereafter, the trial court scheduled a fourth consolidated trial involving three firefighter plaintiffs, which began in December 2012. Prior to the start of this trial, the claims of two of the three firefighter plaintiffs were dismissed. On December 17, 2012, the jury entered a complete defense verdict for the Company.

Following this defense verdict, plaintiffs again moved to certify a class of Chicago Fire Department plaintiffs for trial on the sole issue of whether the Company's sirens were defective and unreasonably dangerous. Over the Company's objection, the trial court granted plaintiffs' motion for class certification on March 11, 2013 and scheduled a class action trial to begin on June 10, 2013. The Company filed a petition for review with the Illinois Appellate Court on March 29, 2013 seeking reversal of the class certification order.

On June 25, 2014, a unanimous three-judge panel of the First District Illinois Appellate Court issued its opinion reversing the class certification order of the trial court. Specifically, the Appellate Court determined that the trial court's ruling failed to satisfy the class-action requirements that the common issues of the firefighters' claims predominate over the individual issues and that there is an adequate representative for the class. During a status hearing on October 8, 2014, plaintiffs represented to the Court that they would again seek to certify a class of firefighters on the issue of whether the Company's sirens were defective and unreasonably dangerous. On January 12, 2015, plaintiffs filed motions to amend their complaints to add class action allegations with respect to Chicago firefighter plaintiffs as well as the approximately 1,800 firefighter plaintiffs from locations outside of Chicago. On March 11, 2015, the trial court granted plaintiff's motions to amend their complaints. On April 24, 2015, the cases were transferred to Cook County chancery court, which will decide all class certification issues. On March 23, 2018, plaintiffs filed a motion to certify as a class all firefighters from the Chicago Fire Department who have filed lawsuits in this matter. The Company has served discovery upon plaintiffs related to this motion and intends to continue its objections to any attempt at certification. The court has scheduled a hearing for this case on March 19, 2019.

The Company has also filed motions to dismiss cases involving firefighters who worked for fire departments located outside of the state of Illinois based on improper venue. On February 24, 2017, the Circuit Court of Cook County entered orders dismissing the cases of 1,770 such firefighter plaintiffs from the jurisdiction of the State of Illinois. Pursuant to these orders, these plaintiffs had six months thereafter to refile their cases in jurisdictions where these firefighters are located. Prior to this six-month deadline, attorneys representing some of these plaintiffs contacted the

Company regarding possible settlement of their cases. During the year ended December 31, 2017, the Company entered into a global settlement agreement with two attorneys who represented approximately 1,090 of these plaintiffs. Under the terms of the settlement agreement, the Company offered \$700 per plaintiff to settle these cases and 717 plaintiffs accepted this offer as a final settlement. The attorneys representing these plaintiffs agreed to withdraw from representing plaintiffs who did not respond to the settlement offer. It is the Company's position that the non-settling plaintiffs who failed to timely refile their cases following the February 2017 dismissal by the Circuit Court of Cook County are now barred from doing so by the statute of limitations. The Company also has filed a venue motion seeking to transfer to DuPage County cases involving 10 plaintiffs who reside and work in Illinois but outside of Cook County. The Court granted this motion on June 28, 2017.

The Company has also been sued on this issue outside of the Cook County, Illinois venue. Between 2007 and 2009, a total of 71 lawsuits involving 71 plaintiffs were filed in the Court of Common Pleas, Philadelphia County, Pennsylvania. Three of these cases were dismissed pursuant to pretrial motions filed by the Company. Another case was voluntarily dismissed. Prior to trial in four cases, the Company paid nominal sums to obtain dismissals. Three trials occurred in Philadelphia involving these cases filed in 2007 through 2009. The first trial involving one of these plaintiffs occurred in 2010, when the jury returned a verdict for the plaintiff. In particular, the jury found that the Company's siren was not defectively designed, but that the Company negligently constructed the siren. The jury awarded damages in the

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

amount of \$0.1 million, which was subsequently reduced to \$0.08 million. The Company appealed this verdict. Another trial, involving nine Philadelphia firefighter plaintiffs, also occurred in 2010 when the jury returned a defense verdict for the Company as to all claims and all plaintiffs involved in that trial. The third trial, also involving nine Philadelphia firefighter plaintiffs, was completed during 2010 when the jury returned a defense verdict for the Company as to all claims and all plaintiffs involved in that trial.

Following defense verdicts in the last two Philadelphia trials, the Company negotiated settlements with respect to all remaining filed cases in Philadelphia at that time, as well as other firefighter claimants represented by the attorney who filed the Philadelphia cases. On January 4, 2011, the Company entered into a Global Settlement Agreement (the “Settlement Agreement”) with the law firm of the attorney representing the Philadelphia claimants, on behalf of 1,125 claimants the firm represented (the “Claimants”) and who had asserted product claims against the Company (the “Claims”). Three hundred eight of the Claimants had lawsuits pending against the Company in Cook County, Illinois. The Settlement Agreement provided that the Company pay a total amount of \$3.8 million (the “Settlement Payment”) to settle the Claims (including the costs, fees and other expenses of the law firm in connection with its representation of the Claimants), subject to certain terms, conditions and procedures set forth in the Settlement Agreement. In order for the Company to be required to make the Settlement Payment: (i) each Claimant who agreed to settle his or her claims had to sign a release acceptable to the Company (a “Release”), (ii) each Claimant who agreed to the settlement and who was a plaintiff in a lawsuit, had to dismiss his or her lawsuit with prejudice, (iii) by April 29, 2011, at least 93% of the Claimants identified in the Settlement Agreement must have agreed to settle their claims and provide a signed Release to the Company and (iv) the law firm had to withdraw from representing any Claimants who did not agree to the settlement, including those who filed lawsuits. If the conditions to the settlement were met, but less than 100% of the Claimants agreed to settle their Claims and sign a Release, the Settlement Payment would be reduced by the percentage of Claimants who did not agree to the settlement.

On April 22, 2011, the Company confirmed that the terms and conditions of the Settlement Agreement had been met and made a payment of \$3.6 million to conclude the settlement. The amount was based upon the Company’s receipt of 1,069 signed releases provided by Claimants, which was 95% of all Claimants identified in the Settlement Agreement. The Company generally denies the allegations made in the claims and lawsuits by the Claimants and denies that its products caused any injuries to the Claimants. Nonetheless, the Company entered into the Settlement Agreement for the purpose of minimizing its expenses, including legal fees, and avoiding the inconvenience, uncertainty and distraction of the claims and lawsuits.

During April through October 2012, 20 new cases were filed in the Court of Common Pleas, Philadelphia County, Pennsylvania. These cases were filed on behalf of 20 Philadelphia firefighters and involve various defendants in addition to the Company. Five of these cases were subsequently dismissed. The first trial involving these 2012 Philadelphia cases occurred during December 2014 and involved three firefighter plaintiffs. The jury returned a verdict in favor of the Company. Following this trial, all of the parties agreed to settle cases involving seven firefighter plaintiffs set for trial during January 2015 for nominal amounts per plaintiff.

In January 2015, plaintiffs' attorneys filed two new complaints in the Court of Common Pleas, Philadelphia, Pennsylvania on behalf of approximately 70 additional firefighter plaintiffs. The vast majority of the firefighters identified in these complaints are located outside of Pennsylvania. One of the complaints in these cases, which involves 11 firefighter plaintiffs from the District of Columbia, was removed to federal court in the Eastern District of Pennsylvania. Plaintiffs voluntarily dismissed all claims in this case on May 31, 2016. The Company thereafter moved to recover various fees and costs in this case, asserting that plaintiffs' counsel failed to properly investigate these claims prior to filing suit. The Court granted this motion on April 25, 2017, awarding \$0.1 million to the Company. After plaintiffs appealed this Order, the United States Court of Appeals for the Third Circuit affirmed the lower court decision awarding fees and costs to the Company.

With respect to claims of other out-of-state firefighters involved in these two cases, the Company moved to dismiss these claims as improperly filed in Pennsylvania. The Court granted this motion and dismissed these claims on November 5, 2015. During August through December 2015, another nine new cases were filed in the Court of Common Pleas, Philadelphia County, Pennsylvania. These cases involve a total of 193 firefighters, most of whom are located outside of Pennsylvania. The Company again moved to dismiss all claims filed by out-of-state firefighters in these cases as improperly filed in Pennsylvania. On May 24, 2016, the Court granted this motion and dismissed these claims. Plaintiffs appealed this decision and, on September 25, 2018, the appellate court reversed this dismissal. The Company has filed a petition with the appellate court requesting that the court reconsider its ruling. On December 7, 2018, the appellate court granted the Company's petition and withdrew its prior decision. The Court has ordered that the parties file additional briefs and a new panel of appellate judges issue a decision.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

On May 13, 2016, four new cases were filed in Philadelphia state court, involving a total of 55 Philadelphia firefighters who live in Pennsylvania. During August 2016, the Company settled a case involving four Philadelphia firefighters that had been set for trial in Philadelphia state court during September 2016. During 2017, plaintiffs filed additional cases in the Court of Common Pleas, Philadelphia County, involving over 100 Philadelphia firefighter plaintiffs. During January 2017, plaintiffs filed a motion to consolidate and bifurcate, similar to a motion filed in the Pittsburgh hearing loss cases, as described below. The Company has filed an opposition to this motion. These cases were then transferred to the mass tort program in Philadelphia for pretrial purposes. Plaintiffs' counsel thereafter dismissed several plaintiffs. During November 2017, a trial involving one Philadelphia firefighter occurred. The jury returned a verdict in favor of the Company in this trial. Prior to a dismissal of these cases pursuant to the Tolling Agreement, discussed below, there was a total of 75 firefighters involved in cases pending in the Philadelphia mass tort program.

During April through July 2013, additional cases were filed in Allegheny County, Pennsylvania on behalf of 247 plaintiff firefighters from Pittsburgh and against various defendants, including the Company. During May 2016, two additional cases were filed against the Company in Allegheny County involving 19 Pittsburgh firefighters. After the Company filed pretrial motions, the Court dismissed claims of 55 Pittsburgh firefighter plaintiffs. The Court scheduled trials for May, September and November 2016, for eight firefighters per trial. Prior to the first scheduled trial in Pittsburgh, the Court granted the Company's motion for summary judgment and dismissed all claims asserted by plaintiff firefighters involved in this trial. Following an appeal by the plaintiff firefighters, the appellate court affirmed this dismissal. The next trial for six Pittsburgh firefighters started on November 7, 2016. Shortly after this trial began, plaintiffs' counsel moved for a mistrial because a key witness suddenly became unavailable. The Court granted this motion and rescheduled this trial for March 6, 2017. During January 2017, plaintiffs also moved to consolidate and bifurcate trials involving Pittsburgh firefighters. In particular, plaintiffs sought one trial involving liability issues which will apply to all Pittsburgh firefighters who filed suit against the Company. The Company filed an opposition to this motion. On April 18, 2017, the trial court granted plaintiffs' motion to bifurcate the next Pittsburgh trial. Pursuant to a motion for clarification filed by the Company, the Court ruled that the bifurcation order would only apply to six plaintiffs who were part of the next trial group in Pittsburgh. The Company thereafter sought an interlocutory appeal of the Court's bifurcation order. The appellate court declined to accept the appeal at that time. A bifurcated trial began on September 27, 2017 in Allegheny County, Pennsylvania. Prior to and during trial, two plaintiffs were dismissed, resulting in four plaintiffs remaining for trial. After approximately two weeks of trial, the jury found that the Company's siren product was not defective or unreasonably dangerous and rendered a verdict in favor of the Company.

A second trial involving Pittsburgh firefighters began during January 2018. At the outset of this trial, plaintiffs' attorneys requested that the Company consider settlement of various cases. This trial was continued to allow the parties to further discuss possible settlement. During March 2018, the parties agreed in principle on a framework to resolve hearing loss claims and cases in all jurisdictions involved in the hearing loss litigation except in Cook County, Lackawanna County, and excluding one case involving one firefighter in New York City. The firefighters excluded

from this settlement framework are represented by different attorneys. Pursuant to this settlement framework, the Company would pay \$700 to each firefighter who has filed a lawsuit and is eligible to be part of the settlement. The Company would pay \$300 to each firefighter who has not yet filed a case and is eligible to be part of the settlement. To be eligible for settlement, among other things, firefighters must provide proof that they have high frequency noise-induced hearing loss. There are approximately 3,700 firefighters whose claims may be considered as part of this settlement, including approximately 1,320 firefighters who have ongoing filed lawsuits. The parties are in the process of determining how many of these firefighters will be eligible to participate in the settlement. In order to minimize the parties' respective legal costs and expenses during this settlement process, on July 5, 2018, the parties entered into a tolling agreement (the "Tolling Agreement"). Pursuant to the Tolling Agreement, counsel for the settling firefighters agreed to dismiss the pending lawsuits in all jurisdictions except for the Allegheny County (Pittsburgh), Pennsylvania cases, and the Company agreed to a tolling of any statute of limitations applicable to the dismissed cases until March 1, 2019. The settlement framework will require plaintiffs' attorneys to withdraw from representing firefighters who elect not to participate in this settlement.

As of December 31, 2018, the Company has recognized an estimated liability for the potential settlement amount. While it is reasonably possible that the ultimate resolution of this matter may result in a loss in excess of the amount accrued, the incremental loss is not expected to be material.

During March 2014, an action also was brought in the Court of Common Pleas of Erie County, Pennsylvania on behalf of 61 firefighters. This case likewise involves various defendants in addition to the Company. After the Company filed pretrial motions, 33 Erie County firefighter plaintiffs voluntarily dismissed their claims. During August 2017, five cases involving 70 firefighter plaintiffs were filed in Lackawanna County, Pennsylvania. These cases involve firefighter plaintiffs who originally

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

filed in Cook County and were dismissed pursuant to the Company's forum nonconveniens motion. As of December 31, 2018, a total of 263 firefighters are involved in cases filed in Allegheny and Lackawanna counties in Pennsylvania.

On September 17, 2014, 20 lawsuits, involving a total of 193 Buffalo Fire Department firefighters, were filed in the Supreme Court of the State of New York, Erie County. All of the cases filed in Erie County, New York have been removed to federal court in the Western District of New York. Plaintiffs have filed a motion to consolidate and bifurcate these cases, similar to the motion filed in the Pittsburgh hearing loss cases, as described above. The Company has filed an opposition to the motion. During February 2015, a lawsuit involving one New York City firefighter plaintiff was filed in the Supreme Court of the State of New York, New York County. The plaintiff named the Company as well as several other parties as defendants. That case subsequently was transferred to federal court in the Northern District of New York and thereafter dismissed. During April 2015 through January 2016, 29 new cases involving a total of 235 firefighters were filed in various counties in the New York City area. During December 2016 through October 2017 additional cases were filed in these jurisdictions. On February 5, 2018, the Company was served with a complaint in an additional case filed in Kings County, New York. This case involves one plaintiff. Prior to a dismissal of these cases pursuant to the Tolling Agreement, there was a total of 536 firefighters involved in cases filed in the State of New York.

During November 2015, the Company was served with a complaint filed in Union County, New Jersey state court, involving 34 New Jersey firefighters. This case has been transferred to federal court in the District of New Jersey. During the period from January through May 2016, eight additional cases were filed in various New Jersey state courts. Most of the firefighters in these cases reside in New Jersey and work or worked at New Jersey fire departments. During December 2016, a case involving one New Jersey firefighter was filed in the United States District Court of New Jersey. On May 2, 2017, plaintiffs filed a motion to consolidate and bifurcate in the pending federal court case in New Jersey. This motion is similar to bifurcation motions filed by plaintiffs in Pittsburgh, Buffalo and Philadelphia. The Court has denied this motion as premature. Pursuant to a petition filed by both parties, all New Jersey state court cases had been consolidated for pretrial purposes. Prior to a dismissal of these cases pursuant to the Tolling Agreement, there was a total of 61 firefighters involved in cases filed in New Jersey. During May through October 2016, nine cases were filed in Suffolk County, Massachusetts state court, naming the Company as a defendant. These cases involve 194 firefighters who lived and worked in the Boston area. During August 2017, plaintiffs filed additional cases in Suffolk County court. The Company has moved to transfer various cases filed in Suffolk County to other counties in Massachusetts where plaintiffs reside and work. Prior to a dismissal of these cases pursuant to the Tolling Agreement, there was a total of 218 firefighters involved in cases filed in Massachusetts.

During August and September 2017, plaintiffs' attorneys filed additional hearing loss cases in Florida. The Company is the only named defendant. These cases have been filed in several different counties in Florida, including Tampa, Miami and Orlando municipalities. Plaintiffs have agreed to stipulate that they will not seek more than \$75,000 in damages in any individual plaintiff case. Prior to a dismissal of these cases pursuant to the Tolling Agreement, there

was a total of 166 firefighters involved in cases filed in Florida.

From 2007 through 2009, firefighters also brought hearing loss claims against the Company in New Jersey, Missouri, Maryland and Kings County, New York. All of those cases, however, were dismissed prior to trial, including four cases in the Supreme Court of Kings County, New York that were dismissed upon the Company's motion in 2008. On appeal, the New York appellate court affirmed the trial court's dismissal of these cases. Plaintiffs' attorneys have threatened to file additional lawsuits. The Company intends to vigorously defend all of these lawsuits, if filed.

The Company's ongoing negotiations with its insurer, CNA, over insurance coverage on these claims have resulted in reimbursements of a portion of the Company's defense costs. These reimbursements are recorded as a reduction of corporate operating expenses. For the years ended December 31, 2018, 2017 and 2016, the Company recorded reimbursements from CNA of \$0.3 million, \$0.6 million and \$0.2 million, respectively, related to legal costs.

Latvian Commercial Dispute

On June 12, 2014, a Latvian trial court issued a summary ruling against the Company's former Bronto subsidiary in a lawsuit relating to a commercial dispute. The dispute involves a transaction for the 2008 sale of three Bronto units that were purchased by a financing company for lease to a Latvian fire department. The lessor and the Latvian fire department sought to rescind the contract after delivery, despite the fact that an independent third party, selected by the lessor, had certified that the vehicles satisfied the terms of the contract. The adverse judgment required Bronto to refund the purchase price and pay interest and attorneys' fees. The trial court denied the lessor's claim against Bronto for alleged damages relating to lost lease income.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Believing that the claims against Bronto were invalid and that Bronto fully satisfied the terms of the subject contract, on July 10, 2014, the Company filed an appeal with the Civil Chamber of the Supreme Court of Latvia seeking a reversal of the trial court's ruling.

At December 31, 2015, the Company had not accrued any liability within its consolidated financial statements for this lawsuit. In evaluating whether a charge to record a reserve was previously necessary, the Company analyzed all of the available information, including the legal reasoning applied by the judge of the trial court in reaching its decision. Based on the Company's analysis, and consultations with external counsel, the Company assessed the likelihood of a successful appeal to be more likely than not and therefore did not believe that a probable loss had been incurred.

In connection with the sale of Bronto to Morita Holdings Corporation ("Morita"), completed in January 2016, the Company and Morita agreed that the Company would remain in control of negotiations and proceedings relating to the appeal and fund the legal costs associated therewith. The Company also agreed to compensate Morita for 50% of any liability resulting from a final and non-appealable decision of a court of competent jurisdiction, net of any actual income tax benefit to Bronto as a result of the judgment, and less 50% of legal fees incurred by the Company, relating to the defense of this matter, subsequent to the January 29, 2016 closing date of the sale.

In April 2016, the Civil Chamber of the Supreme Court of Latvia heard the Company's appeal and upheld the trial court's ruling against Bronto. As the Company's appeal of the trial judgment was unsuccessful, a charge of \$1.3 million was recorded as a component of Gain from discontinued operations and disposal, net of tax in the year ended December 31, 2016, to reflect the Company's share of the liability. The Company decided not to further appeal the Supreme Court's ruling and, during the year ended December 31, 2017, settled the liability due to Morita.

NOTE 13 — EARNINGS PER SHARE

The Company computes earnings per share ("EPS") in accordance with ASC 260, Earnings per Share, which requires that non-vested restricted stock containing non-forfeitable dividend rights should be treated as participating securities pursuant to the two-class method. Under the two-class method, net income is reduced by the amount of dividends declared in the period for common stock and participating securities. The remaining undistributed earnings are then allocated to common stock and participating securities as if all of the net income for the period had been distributed. The amounts of distributed and undistributed earnings allocated to participating securities for the years ended December 31, 2018, 2017 and 2016 were insignificant and did not materially impact the calculation of basic or diluted EPS.

Basic EPS is computed by dividing income or loss available to common stockholders by the weighted average number of shares of common stock outstanding for the year.

Diluted EPS is computed using the weighted average number of shares of common stock and non-vested restricted stock awards outstanding for the year, plus the effect of dilutive potential common shares outstanding during the year. The dilutive effect of common stock equivalents is determined using the more dilutive of the two-class method or alternative methods. We use the treasury stock method to determine the potentially dilutive impact of our employee stock options and restricted stock units, and the contingently issuable method for our performance-based restricted stock unit awards.

For the years ended December 31, 2018, 2017 and 2016, options to purchase 0.3 million, 0.7 million and 1.3 million shares of the Company's common stock, respectively, had an anti-dilutive effect on EPS, and accordingly, are excluded from the calculation of diluted EPS.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following table reconciles net income to basic and diluted EPS:

(in millions, except per share data)	2018	2017	2016
Income from continuing operations	\$93.7	\$60.5	\$39.4
Gain from discontinued operations and disposal, net of tax	0.3	1.1	4.4
Net income	\$94.0	\$61.6	\$43.8
Weighted average shares outstanding — Basic	59.9	59.7	60.4
Dilutive effect of common stock equivalents	1.3	0.7	0.8
Weighted average shares outstanding — Diluted	61.2	60.4	61.2
Basic earnings per share:			
Earnings from continuing operations	\$1.56	\$1.01	\$0.65
Earnings from discontinued operations and disposal, net of tax	0.01	0.02	0.07
Net earnings per share	\$1.57	\$1.03	\$0.72
Diluted earnings per share:			
Earnings from continuing operations	\$1.53	\$1.00	\$0.64
Earnings from discontinued operations and disposal, net of tax	0.01	0.02	0.07
Net earnings per share	\$1.54	\$1.02	\$0.71

NOTE 14 — STOCK-BASED COMPENSATION

The Company's stock compensation plan, approved by the Company's stockholders and administered by the Compensation and Benefits Committee of the Board of Directors of the Company (the "CBC"), provides for the grant of incentive stock options, restricted stock and other stock-based awards or units to key employees and directors. The plan authorizes the grant of up to 7.8 million shares or units through April 2025. At December 31, 2018, approximately 4.9 million shares were available for future issuance under the plan.

The total compensation expense related to all grants awarded under the plan was \$7.6 million, \$4.6 million and \$4.8 million, for the years ended December 31, 2018, 2017 and 2016, respectively. The related income tax benefits recognized in earnings were \$1.8 million, \$1.1 million and \$2.2 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Stock Options

Stock options vest ratably (i.e. one-third annually) over the three years from the date of the grant. The cost of stock options, based on their fair value at the date of grant, is charged to expense over the respective vesting periods. Stock options normally become exercisable at a rate of one-third annually and in full on the third anniversary date. Under the plan, all options and rights must be exercised within ten years from date of grant. At the Company's discretion, vested stock option holders are permitted to elect an alternative settlement method in lieu of purchasing common stock at the option price. The alternative settlement method permits the employee to receive, without payment to the Company, cash, shares of common stock or a combination thereof equal to the excess of market value of common stock over the option purchase price. The Company has historically settled all such options in common stock and intends to continue to do so. Stock options do not have voting or dividend rights until such time that the options are

exercised and shares have been issued.

The weighted average fair value of options granted during 2018, 2017 and 2016 was \$7.17, \$7.00 and \$4.25, respectively.

The fair value of each option grant was estimated using the Black-Scholes option pricing model with the following weighted average assumptions:

	2018	2017	2016
Dividend yield	1.4%	1.7%	2.2%
Expected volatility	32 %	45 %	43 %
Risk free interest rate	2.9%	2.2%	1.3%
Weighted average expected option life in years	5.9	7.5	5.8

72

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The expected life of options represents the weighted average period of time that options granted are expected to be outstanding giving consideration to vesting schedules and the Company's historical exercise patterns. The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the time of the grant for periods corresponding with the expected life of the options. Expected volatility is based on historical volatility of the Company's common stock. Dividend yields are based on historical dividend payments.

The following summarizes stock option activity:

(in millions)	Option Shares			Weighted Average Exercise Price		
	2018	2017	2016	2018	2017	2016
Outstanding, at beginning of year	2.3	2.6	2.1	\$ 11.08	\$ 10.71	\$ 10.29
Granted	0.3	0.5	0.7	23.14	15.30	12.69
Exercised	(0.2)	(0.3)	(0.1)	9.49	10.53	8.39
Canceled or expired	—	(0.5)	(0.1)	18.03	14.10	15.77
Outstanding, at end of year	2.4	2.3	2.6	\$ 12.51	\$ 11.08	\$ 10.71
Exercisable, at end of year	1.8	1.6	1.6	\$ 10.59	\$ 9.57	\$ 8.96

At December 31, 2018, options that have vested and are expected to vest totaled 2.3 million shares, with a weighted average exercise price of \$12.29, and represent the sum of 1.8 million vested (or exercisable) options and 0.5 million options that are expected to vest. Options that are expected to vest are derived by applying the pre-vesting forfeiture rate assumption against outstanding, unvested options as of December 31, 2018.

The following table summarizes information for stock options outstanding as of December 31, 2018 under all plans:

Range of Exercise Prices	Options Outstanding			Options Exercisable	
	Shares	Weighted Average Remaining Life	Weighted Average Exercise Price	Shares	Weighted Average Exercise Price
	(in millions)			(in millions)	
\$5.01 — \$10.00	0.9	3.2	\$ 6.59	0.9	\$ 6.59
10.01 — 15.00	0.8	6.7	13.12	0.6	13.26
15.01 — 20.00	0.5	7.2	16.51	0.3	16.29
20.01 — 25.00	0.2	9.3	23.14	—	23.14
	2.4	5.8	\$ 12.51	1.8	\$ 10.59

The aggregate intrinsic value of stock options outstanding and exercisable at December 31, 2018 was \$18.2 million and \$16.4 million, respectively. The total intrinsic value of stock options exercised was \$3.0 million, \$2.3 million and \$0.4 million for the years ended December 31, 2018, 2017 and 2016, respectively. The related tax benefits were \$0.8 million, \$0.9 million and \$0.1 million for the years ended December 31, 2018, 2017 and 2016, respectively. Cash received from the exercise of stock options was \$1.3 million, \$1.6 million and \$0.5 million for the years ended

December 31, 2018, 2017 and 2016, respectively.

The total compensation expense related to all stock option compensation plans was \$2.1 million, \$2.2 million and \$2.1 million for the years ended December 31, 2018, 2017 and 2016, respectively. As of December 31, 2018, there was \$2.1 million of total unrecognized compensation cost related to stock options that is expected to be recognized over the weighted-average period of approximately 1.8 years.

Restricted Stock

Restricted stock awards and restricted stock units primarily cliff vest at the third anniversary from the date of grant, provided the recipient is still employed by the Company on the vesting date. The cost of restricted stock, based on the fair market value of the underlying shares determined using the closing market price on the date of grant, is charged to expense over the respective vesting periods. Shares associated with non-vested restricted stock awards have the same voting rights as the Company's common stock and have non-forfeitable rights to dividends. Shares associated with non-vested restricted stock units do not have voting or dividend rights.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following table summarizes restricted stock activity for the year ended December 31, 2018:

	Number of Restricted Shares (in millions)	Weighted Average Price per Share
Outstanding and non-vested, at December 31, 2017	0.2	\$ 15.52
Granted	0.1	22.85
Vested	(0.1)	18.23
Forfeited	—	17.48
Outstanding and non-vested, at December 31, 2018	0.2	\$ 18.12

The total grant-date fair value of restricted stock that vested in the years ended December 31, 2018, 2017 and 2016 was \$1.0 million, \$1.5 million and \$1.3 million, respectively.

The total compensation expense related to all restricted stock compensation plans was \$1.8 million, \$1.6 million and \$1.2 million for the years ended December 31, 2018, 2017 and 2016, respectively. As of December 31, 2018, there was \$1.7 million of total unrecognized compensation cost related to restricted stock that is expected to be recognized over the weighted-average period of approximately 1.9 years.

Performance Awards

In each of the three years in the period ended December 31, 2018, the Company granted performance-based restricted stock unit awards (“PSUs”) to certain executives and other non-executive officers. Performance targets associated with PSUs are set annually and approved by the CBC. At the Company’s discretion, actual payment of the awards earned shall be in cash or in common stock of the Company, or in a combination of both. The Company intends to settle all such awards by issuing shares of its common stock. The number of shares of common stock that the Company may issue in connection with these PSUs can range from 0% to 200% of target, depending upon achievement against the performance targets. Shares associated with non-vested PSUs do not have voting or dividend rights until issuance. The Company assesses the probability of vesting, based on expected achievement against these performance targets, on a quarterly basis.

The cost of PSUs, based on their fair market value determined using the closing market price on the date of grant, is charged to expense over the respective vesting periods, which is the three-year period ended December 31, 2018 for the 2016 grants, the three-year period ended December 31, 2019 for the 2017 grants and the three-year period ended December 31, 2020 for the 2018 grants.

The PSUs granted in 2018 have a three-year performance period ending December 31, 2020, in which the Company must achieve a certain cumulative EPS from continuing operations and a certain average return on invested capital (“ROIC”), which are performance conditions per ASC 718. If earned, these shares would vest on December 31, 2020. The PSUs granted in 2017 have a three-year performance period ending December 31, 2019, in which the Company must achieve a certain cumulative EPS from continuing operations and a certain average ROIC, which are performance conditions per ASC 718. If earned, these shares would vest on December 31, 2019.

The PSUs granted in 2016 had a three-year performance period ending December 31, 2018, in which a certain cumulative EPS from continuing operations and a certain average ROIC was targeted. The PSUs granted in 2016 became fully vested on December 31, 2018. Based on the achievement against targets over the three-year performance period, 98% of the target shares were earned. The underlying shares will be issued to participants in the first quarter of 2019.

The total grant-date fair value of PSUs that vested in the years ended December 31, 2018, 2017 and 2016 was \$1.7 million, \$0.3 million and \$3.7 million, respectively.

Compensation expense included in the Consolidated Statements of Operations for the PSUs in the years ended December 31, 2018, 2017 and 2016 was \$3.7 million, \$0.8 million and \$1.5 million, respectively. As of December 31, 2018, there was \$4.5 million of total unrecognized compensation cost related to PSUs that is expected to be recognized over the weighted-average period of approximately 1.7 years.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following table summarizes PSU activity for the year ended December 31, 2018:

	Number of PSUs	Weighted Average Price per Share
	(in millions)	
Outstanding and non-vested, at December 31, 2017	0.3	\$ 15.19
Granted	0.1	23.14
Vested	(0.1)	12.87
Forfeited	—	16.30
Outstanding and non-vested, at December 31, 2018	0.3	\$ 20.13

NOTE 15 — STOCKHOLDERS' EQUITY

The Company's Board of Directors (the "Board") has the authority to issue 90.0 million shares of common stock at a par value of \$1 per share. The holders of common stock (i) may receive dividends subject to all of the rights of the holders of preference stock, (ii) shall be entitled to share ratably upon any liquidation of the Company in the assets of the Company, if any, remaining after payment in full to the holders of preference stock and (iii) receive one vote for each common share held and shall vote together share for share with the holders of voting shares of preference stock as one class for the election of directors and for all other purposes. The Company had 66.4 million and 66.1 million common shares issued as of December 31, 2018 and 2017, respectively. Of those amounts, 60.2 million and 60.0 million common shares were outstanding as of December 31, 2018 and 2017, respectively.

The Board is also authorized to provide for the issuance of 0.8 million shares of preference stock at a par value of \$1 per share. The authority of the Board includes, but is not limited to, the determination of the dividend rate, voting rights, conversion and redemption features and liquidation preferences. The Company has not designated or issued any preference stock as of December 31, 2018.

Dividends

The Company declared and paid dividends totaling \$18.7 million, \$16.8 million and \$16.9 million during 2018, 2017 and 2016, respectively.

On February 19, 2019, the Board declared a quarterly cash dividend of \$0.08 per common share payable on March 29, 2019 to holders of record at the close of business on March 18, 2019.

Stock Repurchase Program

In November 2014, the Board authorized a stock repurchase program of up to \$75.0 million of the Company's common stock. The stock repurchase program is intended primarily to facilitate opportunistic purchases of Company stock as a means to provide cash returns to stockholders, enhance stockholder returns and manage the Company's capital structure.

During the year ended December 31, 2018, the Company repurchased 62,500 shares for a total of \$1.2 million under the stock repurchase program. No shares were repurchased during the year ended December 31, 2017. During the year ended December 31, 2016, the Company repurchased 2,961,007 shares for a total of \$37.8 million under the stock repurchase program.

Under its stock repurchase program, the Company is authorized to repurchase, from time to time, shares of its outstanding common stock in the open market or through privately negotiated transactions. Stock repurchases by the Company are subject to market conditions and other factors and may be commenced, suspended or discontinued at any time.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Accumulated Other Comprehensive Loss

The following tables summarize the changes in each component of Accumulated other comprehensive loss, net of tax:

(in millions) ^(a)	Actuarial Losses	Prior Service Costs	Foreign Currency Translation	Unrealized Gain on Derivatives	Total
Balance at January 1, 2018	\$ (75.4)	\$ —	\$ (2.5)	\$ 1.0	\$(76.9)
Other comprehensive (loss) income before reclassifications	(3.9)	(2.5)	(6.4)	0.8	(12.0)
Amounts reclassified from accumulated other comprehensive loss	2.7	—	—	(0.5)	2.2
Net current-period other comprehensive (loss) income	(1.2)	(2.5)	(6.4)	0.3	(9.8)
Impact of adoption of ASU 2018-02 ^(c)	(10.8)	—	—	0.2	(10.6)
Balance at December 31, 2018	\$ (87.4)	\$ (2.5)	\$ (8.9)	\$ 1.5	\$(97.3)

(in millions) ^(a)	Actuarial Losses ^(b)	Foreign Currency Translation	Unrealized Gain on Derivatives	Total
Balance at January 1, 2017	\$ (79.0)	\$ (13.0)	\$ —	\$(92.0)
Other comprehensive (loss) income before reclassifications	(2.2)	10.5	0.8	9.1
Amounts reclassified from accumulated other comprehensive loss	5.8	—	0.2	6.0
Net current-period other comprehensive income	3.6	10.5	1.0	15.1
Balance at December 31, 2017	\$ (75.4)	\$ (2.5)	\$ 1.0	\$(76.9)

(a) Amounts in parentheses indicate losses.

During the year ended December 31, 2017, the Company reclassified \$6.1 million of actuarial losses from

(b) Accumulated other comprehensive loss to Pension settlement charges on the Consolidated Statements of Operations.

(c) Refer to Note 1– Summary of Significant Accounting Policies for further discussion of the adoption of ASU 2018-02.

The following table summarizes the amounts reclassified from Accumulated other comprehensive loss, net of tax, and the affected line item in the Consolidated Statements of Operations:

Details about Accumulated Other Comprehensive Loss Components	Amount Reclassified from Accumulated Other Comprehensive Loss		Affected Line Item in Consolidated Statements of Operations ^(a)
	2018	2017	

Edgar Filing: FEDERAL SIGNAL CORP /DE/ - Form 10-K

(in millions) ^(b)

Amortization of actuarial losses of defined benefit pension plans	\$ (3.6)	\$ (3.1)	Other expense (income), net
Recognition of actuarial losses associated with pension settlement	—	(6.1)	Pension settlement charges
Interest income (expense) on interest rate swap	0.6	(0.3)	Interest expense
Total before tax	(3.0)	(9.5)	
Income tax benefit	0.8	3.5	Income tax expense
Total reclassifications for the period, net of tax	\$ (2.2)	\$ (6.0)	

(a) Continuing operations only.

(b) Amount in parentheses indicate debits to profit/loss.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

NOTE 16 — SEGMENT INFORMATION

The Company has two reportable segments. Business units are organized under each reportable segment because they share certain characteristics, such as technology, marketing, distribution and product application, which create long-term synergies. The principal activities of the Company's reportable segments are as follows:

Environmental Solutions — Our Environmental Solutions Group is a leading manufacturer and supplier of a full range of street sweeper vehicles, sewer cleaner and vacuum loader trucks, hydro-excavation trucks, high-performance waterblasting equipment, dump truck bodies and trailers. The Group manufactures vehicles and equipment in the U.S. and Canada that are sold under the Elgin[®], Vactor[®], Guzzler[®], Westech[™], Jetstream[®], Ox Bodies[®], Crysteel[®], J-Craft[®], Duraclass[®], Rugby[®] and Travis[®] brand names. Product offerings also include certain products manufactured by other companies, such as refuse and recycling collection vehicles, camera systems, ice resurfacing equipment and snow-removal equipment. Products are sold to both municipal and industrial customers either through a dealer network or direct sales to service customers generally depending on the type and geographic location of the customer. In addition to vehicle and equipment sales, the Group also engages in the sale of parts, service and repair, equipment rentals and training as part of a complete aftermarket offering to its current and potential customers through its service centers located across North America. Our Environmental Solutions Group includes the aggregated results of two operating segments, including TBEI.

Safety and Security Systems — Our Safety and Security Systems Group is a leading manufacturer and supplier of comprehensive systems and products that law enforcement, fire rescue, emergency medical services, campuses, military facilities and industrial sites use to protect people and property. Offerings include systems for campus and community alerting, emergency vehicles, first responder interoperable communications and industrial communications, as well as command and municipal networked security. Specific products include vehicle lightbars and sirens, public warning sirens, general alarm systems, public address systems and public safety software. Products are sold under the Federal Signal[™], Federal Signal VAMA[®] and Victor[®] brand names. The Group operates manufacturing facilities in the U.S., Europe and South Africa.

Corporate contains those items that are not included in our reportable segments.

Net sales by reportable segment reflect sales of products and services to external customers, as reported in the Company's Consolidated Statements of Operations. Intersegment sales are insignificant. The Company evaluates performance based on operating income of the respective segment. Operating income includes all revenues, costs and expenses directly related to the segment involved. In determining reportable segment income, neither corporate nor interest expenses are included. Reportable segment depreciation and amortization expense, identifiable assets and capital expenditures relate to those assets that are utilized by the respective reportable segment. Corporate assets consist principally of cash and cash equivalents, deferred tax assets and fixed assets. The accounting policies of each reportable segment are the same as those described in Note 1 – Summary of Significant Accounting Policies.

Revenues attributed to customers located outside of the U.S. aggregated \$241.5 million in 2018, \$224.4 million in 2017 and \$197.7 million in 2016, of which sales exported from the U.S. aggregated \$64.5 million, \$58.0 million and \$88.0 million, respectively.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following tables summarize the Company's continuing operations by segment, including net sales, operating income, depreciation and amortization, total assets and capital expenditures:

(in millions)	2018	2017	2016
Net sales:			
Environmental Solutions	\$863.5	\$692.6	\$490.7
Safety and Security Systems	226.0	205.9	217.2
Total net sales	\$1,089.5	\$898.5	\$707.9
Operating income:			
Environmental Solutions	\$113.0	\$72.4	\$54.5
Safety and Security Systems	34.1	27.0	27.9
Corporate and eliminations	(25.6)	(25.8)	(21.6)
Total operating income	121.5	73.6	60.8
Interest expense	9.3	7.3	1.9
Debt settlement charges	—	—	0.3
Pension settlement charges	—	6.1	—
Other expense (income), net	0.6	(0.8)	1.8
Income before income taxes	\$111.6	\$61.0	\$56.8
(in millions)	2018	2017	2016
Depreciation and amortization:			
Environmental Solutions	\$32.6	\$25.7	\$14.5
Safety and Security Systems	3.7	4.1	4.4
Corporate	0.1	0.2	0.2
Total depreciation and amortization	\$36.4	\$30.0	\$19.1
(in millions)	2018	2017	2016
Total assets:			
Environmental Solutions	\$775.2	\$746.4	\$393.3
Safety and Security Systems	211.5	211.8	200.1
Corporate and eliminations	36.7	33.6	48.7
Total assets of continuing operations	1,023.4	991.8	642.1
Total assets of discontinued operations	0.4	0.5	1.1
Total assets	\$1,023.8	\$992.3	\$643.2
(in millions)	2018	2017	2016
Capital expenditures:			
Environmental Solutions	\$11.1	\$5.2	\$3.7
Safety and Security Systems	2.0	2.2	1.8
Corporate	1.0	0.6	0.6

Total capital expenditures \$14.1 \$8.0 \$6.1

The following table summarizes net sales by geographic region based on the location of the end customer:

(in millions) 2018 2017 2016

Net sales:

U.S. \$848.0 \$674.1 \$510.2

Canada 150.9 142.6 111.5

Europe/Other 90.6 81.8 86.2

Total net sales \$1,089.5 \$898.5 \$707.9

78

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following table summarizes long-lived assets (excluding deferred tax and intangible assets) by geographic region based on the location of the Company's subsidiaries:

(in millions)	2018	2017	2016
Long-lived assets (excluding deferred tax and intangible assets):			
U.S.	\$ 110.3	\$ 97.0	\$ 78.7
Canada	50.4	52.3	46.1
Europe	3.2	3.1	2.5
Other	0.3	0.3	0.3
Total long-lived assets	\$ 164.2	\$ 152.7	\$ 127.6

NOTE 17 — FAIR VALUE MEASUREMENTS

The Company uses a three-level fair value hierarchy that prioritizes the inputs used to measure fair value. This hierarchy maximizes the use of observable inputs and minimizes the use of unobservable inputs. Observable inputs are developed based on market data obtained from independent sources, while unobservable inputs reflect the Company's assumptions about valuation based on the best information available in the circumstances. The three levels of inputs are classified as follows:

Level 1 — quoted prices in active markets for identical assets or liabilities;

Level 2 — observable inputs, other than quoted prices included in Level 1, such as quoted prices for markets that are not active, or other inputs that are observable or can be corroborated by observable market data; and

Level 3 — unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities, including certain pricing models, discounted cash flow methodologies and similar techniques that use significant unobservable inputs.

In determining fair value, the Company uses various valuation approaches within the fair value measurement framework. The valuation methodologies used for the Company's assets and liabilities measured at fair value and their classification in the valuation hierarchy are summarized below:

Cash Equivalents

Cash equivalents primarily consist of time-based deposits and interest-bearing instruments with maturities of three months or less. The Company classified cash equivalents as Level 1 due to the short-term nature of these instruments and measured the fair value based on quoted prices in active markets for identical assets.

Interest Rate Swap

As described in Note 8 – Debt, the Company entered into an interest rate swap as a means of fixing the floating interest rate component on a portion of its floating-rate debt. The Company classified the interest rate swap as Level 2 due to the use of a discounted cash flow model based on the terms of the contract and the interest rate curve (Level 2 inputs) to calculate the fair value of the swap.

Contingent Consideration

The Company has a contingent obligation to transfer cash to the former owners of JJE if specified financial results are met over future reporting periods (i.e., an earn-out). Liabilities for contingent consideration are measured at fair value

each reporting period, with the acquisition-date fair value included as part of the consideration transferred. Subsequent changes in fair value are recorded as a component of Acquisition and integration-related expenses on the Consolidated Statements of Operations.

The Company uses an income approach to value the contingent consideration obligation based on future financial performance, which is determined based on the present value of expected future cash flows. Due to the lack of relevant observable market data over fair value inputs, the Company has classified the contingent consideration liability within Level 3 of the fair value hierarchy outlined in ASC 820, Fair Value Measurements. Increases in the expected payout under a contingent consideration arrangement contribute to increases in the fair value of the related liability. Conversely, decreases in the expected payout under a contingent consideration arrangement contribute to decreases in the fair value of the related liability. Changes in assumptions could have an impact on the fair value of the contingent consideration, which has a maximum payout of C\$10.0 million (approximately \$7.3 million).

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The following tables summarize the Company's assets and liabilities that are measured at fair value on a recurring basis as of December 31, 2018 and 2017:

(in millions)	Fair Value Measurement at December 31, 2018			
	Using			Total
	Level 1	Level 2	Level 3	

Assets:				
Cash equivalents	\$ 14.1	\$ —	—\$	—\$ 14.1
Interest rate swap	—	2.0	—	2.0

Liabilities:				
Contingent consideration	—	—	6.7	6.7

(in millions)	Fair Value Measurement at December 31, 2017			
	Using			Total
	Level 1	Level 2	Level 3	

Assets:				
Cash equivalents	\$ 14.4	\$ —	—\$	—\$ 14.4
Interest rate swap	—	1.6	—	1.6

Liabilities:				
Contingent consideration	—	—	6.3	6.3

The following table provides a roll-forward of the fair value of recurring Level 3 fair value measurements for the years ended December 31, 2018 and 2017:

(in millions)	Year Ended December 31, 2018	Year Ended December 31, 2017
Contingent consideration liability, at beginning of period	\$ 6.3	\$ 5.1
Foreign currency translation	(0.5)	0.4
Total losses included in earnings ^(a)	0.9	0.8
Contingent consideration liability, at end of period	\$ 6.7	\$ 6.3

(a) Changes in the fair value of contingent consideration liabilities are included as a component of Acquisition and integration-related expenses within the Consolidated Statements of Operations.

NOTE 18 — DISCONTINUED OPERATIONS

In the year ended December 31, 2018, the Company recorded a net gain from discontinued operations and disposal of \$0.3 million, primarily due to adjustments of estimated product liability obligations of previously discontinued businesses, resulting from updated actuarial valuations.

In the year ended December 31, 2017, the Company recorded a net gain from discontinued operations and disposal of \$1.1 million, primarily due to an adjustment of foreign tax credits associated with the sale of the Fire Rescue Group and adjustments of estimated product liability obligations of previously discontinued businesses, resulting from updated actuarial valuations.

In the year ended December 31, 2016, the Company recorded a net gain from discontinued operations and disposal of \$4.4 million, primarily driven by the \$4.2 million net gain on disposal of the Fire Rescue Group, which was discontinued in 2015, partially offset by the \$0.6 million net loss that the Fire Rescue Group realized in its 2016 operations up to the January 29, 2016 sale completion date. The net gain on disposal includes a \$1.3 million charge to recognize a liability in connection with a Latvian commercial dispute. Also contributing to the net gain in 2016 was a reduction in uncertain tax position reserves of approximately \$1.0 million, as well as adjustments of estimated product liability obligations of previously discontinued businesses, resulting from updated actuarial valuations.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

The activity of the Company's discontinued operations in each of the years ended December 31, 2018, 2017 and 2016 is described further below:

Fire Rescue Group

On January 29, 2016, the Company completed the sale of Bronto to Morita, initially receiving proceeds of €76.0 million in cash at closing (approximately \$82.3 million), with an additional €5.1 million in cash (approximately \$5.7 million) being received in connection with the payment of the final working capital and net debt adjustments in the second quarter of 2016.

Prior to sale, Bronto was the only remaining operation in the Company's Fire Rescue Group, which was previously identified as a reportable segment of the Company as defined under ASC 280. Following the completion of the transaction, the Company no longer operates the Fire Rescue Group, which the Company considered a significant strategic shift in the Company's operations, and as such, the Fire Rescue Group has been presented as a discontinued operation in the Company's consolidated financial statements.

Under the terms of the sale, the Company and Morita agreed that the Company will remain in control of negotiations and proceedings relating to the appeal of the ruling issued in the Latvian commercial dispute, discussed further in Note 12 – Legal Proceedings, and also fund the legal costs associated therewith. The Company also agreed to compensate Morita for 50% of any liability resulting from a final and non-appealable decision of a court of competent jurisdiction, net of any actual income tax benefit to Bronto as a result of the judgment, and less 50% of legal fees incurred by the Company between the January 29, 2016 date of sale and the date of receiving such non-appealable decision. The Company's appeal of the initial judgment, heard in April 2016, was unsuccessful, and a charge of \$1.3 million was recorded as a component of Gain from discontinued operations and disposal, net of tax in the year ended December 31, 2016 to reflect the Company's share of the liability. The Company decided not to further appeal the Supreme Court's ruling and, during the year ended December 31, 2017, settled the liability due to Morita.

After recognition of the accumulated foreign currency translation loss and actuarial losses attributable to the Fire Rescue Group, the \$1.3 million liability recorded in connection with the Latvian commercial dispute, as well as \$4.6 million of net income tax expense, the Company recognized a net gain of \$4.2 million on disposal of the Fire Rescue Group upon completion of the sale in the year ended December 31, 2016.

The following table presents the operating results of the Company's discontinued Fire Rescue Group for each of the three years in the period ended December 31, 2018:

(in millions)	2016 ^(a)
Net sales	\$ 4.2
Cost of sales	3.9
Gross profit	0.3
Selling, engineering, general and administrative expenses	1.1
Operating loss	(0.8)
Other income, net	—
Loss before income taxes	(0.8)

Income tax benefit (0.2)

Net loss from operations \$ (0.6)

(a) Only includes activity in the period up to the completion of the sale on January 29, 2016.

81

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Assets and liabilities of discontinued operations

The following table presents the assets and liabilities of the Company's discontinued operations, which include the Fire Rescue Group, as well as other operations discontinued in prior periods, as of December 31, 2018 and 2017:

(in millions)	2018			2017		
	Fire Rescue	Other	Total	Fire Rescue	Other	Total
Deferred tax assets	\$—	\$0.4	\$0.4	\$—	\$0.5	\$0.5
Long-term assets of discontinued operations	\$—	\$0.4	\$0.4	\$—	\$0.5	\$0.5
Accrued liabilities:						
Other current liabilities	\$—	\$0.2	\$0.2	\$—	\$0.5	\$0.5
Current liabilities of discontinued operations	\$—	\$0.2	\$0.2	\$—	\$0.5	\$0.5
Other long-term liabilities	\$—	\$1.4	\$1.4	\$—	\$1.5	\$1.5
Long-term liabilities of discontinued operations	\$—	\$1.4	\$1.4	\$—	\$1.5	\$1.5

The Company retains certain liabilities for other operations discontinued in prior periods, primarily for environmental remediation and product liability. Included in liabilities of discontinued operations at December 31, 2018 and 2017 is \$0.4 million and \$0.5 million, respectively, related to environmental remediation at the Pearland, Texas facility, and \$1.1 million and \$1.4 million, respectively, relating to estimated product liability obligations of the discontinued North American refuse truck body business.

NOTE 19 — NEW ACCOUNTING PRONOUNCEMENTS (ISSUED BUT NOT YET ADOPTED)

In February 2016, the FASB issued ASU No. 2016-02, Leases ("Topic 842"), which supersedes the lease accounting requirements in ASC 840, Leases ("Topic 840"). Topic 842 requires organizations that are lessees in operating lease arrangements to recognize right-of-use assets and lease liabilities on the balance sheet and requires disclosure of key qualitative and quantitative information about leasing arrangements by both lessors and lessees. Topic 842 is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Early adoption is permitted. As originally issued, entities would have been required to recognize and measure operating leases at the beginning of the earliest period presented using a modified retrospective approach. In July 2018, the FASB issued ASU No. 2018-11, Leases (Topic 842): Targeted Improvements, which provides entities with an alternative transition method that permits application of the new guidance at the beginning of the period of adoption, with comparative periods continuing to be reported under Topic 840.

The Company will adopt Topic 842 effective January 1, 2019, and expects to follow the alternative transition method outlined in ASU 2018-11. Upon adoption, the Company expects to elect a number of practical expedients outlined in the transition guidance which, among other things, allow for the carryforward of historical lease classifications. In addition, the Company expects that it will separately account for non-lease and associated lease components and will apply the short-term lease exception, whereby the Company will not recognize a right-of-use asset or lease liability for

leases with an initial term of twelve months or less.

In addition to the expanded disclosure requirements, the Company currently anticipates the most significant adoption impacts will include (i) the recognition of right-of-use assets and lease liabilities of approximately \$25 million to \$30 million on its Consolidated Balance Sheets, and (ii) a change to the Company's recognition of the deferred gain associated with the sale-leaseback transactions that the Company entered into in July 2008 for its Elgin, Illinois and University Park, Illinois plant locations, as discussed further in Note 5 – Properties and Equipment. The deferred gain, which initially totaled \$29.0 million, has been amortized through the Company's Consolidated Statement of Operations on a straight-line basis over the 15-year life of the respective leases, since 2008. As a result, approximately \$1.9 million of the deferred gain has been recognized each year since 2008. Effective in 2019, the Company will no longer recognize any portion of the gain through the Consolidated Statement of Operations, and will recognize the remaining deferred gain balance, net of the related deferred tax asset, as a cumulative effect adjustment to opening retained earnings. As of December 31, 2018, the deferred gain balance totaled \$8.7 million.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Other than the aforementioned loss of the deferred gain recognition, the adoption of Topic 842 is not expected to have a material impact on the Company's results of operations or cash flows. Further, we do not expect the adoption of Topic 842 to have an impact on our liquidity or on our debt-covenant compliance under our current arrangements. No other new accounting pronouncements issued, but not yet adopted, are expected to have a material impact on the Company's results of operations, financial position or cash flow.

NOTE 20 — SELECTED QUARTERLY DATA (UNAUDITED)

The Company reports its interim quarterly periods on a 13-week basis ending on a Saturday with the fiscal year ending on December 31. The effects of this practice exist only within a reporting year. For ease of presentation, the Company uses "March 31," "June 30," "September 30" and "December 31" to refer to its results of operations for the quarterly periods then ended. In 2018, the Company's interim quarterly periods ended March 31, June 30, September 29 and December 31. In 2017, the Company's interim quarterly periods ended April 1, July 1, September 30 and December 31.

The following table summarizes the quarterly results of operations, including earnings per share:

(in millions, except per share data)	2018			
	March 31 ^(a)	June 30 ^(b)	September 30 ^(c)	December 31 ^(d)
Net sales	\$249.7	\$291.0	\$ 269.4	\$ 279.4
Gross profit	61.9	79.2	69.0	72.0
Income from continuing operations	12.9	26.9	21.7	32.2
Gain from discontinued operations and disposal, net	—	—	—	0.3
Net income	\$12.9	\$26.9	\$ 21.7	\$ 32.5
Diluted earnings per share:				
Earnings from continuing operations	\$0.21	\$0.44	\$ 0.36	\$ 0.53
Earnings from discontinued operations	—	—	—	—
Net earnings per share	\$0.21	\$0.44	\$ 0.36	\$ 0.53

Income from continuing operations includes pre-tax purchase accounting expenses, acquisition and (a) integration-related expenses and hearing loss settlement charges of \$0.6 million, \$0.5 million and \$0.4 million, respectively.

(b) Income from continuing operations includes pre-tax purchase accounting expenses and acquisition and integration-related expenses of \$0.4 million and \$0.4 million, respectively.

(c) Income from continuing operations includes pre-tax purchase accounting expenses and acquisition and integration-related expenses of \$0.1 million and \$0.4 million, respectively.

Income from continuing operations includes pre-tax purchase accounting expenses and acquisition and (d) integration-related expenses of \$0.1 million and \$0.2 million, respectively, as well as an \$8.6 million net benefit from tax planning strategies.

Edgar Filing: FEDERAL SIGNAL CORP /DE/ - Form 10-K

(in millions, except per share data)	2017			
	March 31 ^(a)	June 30 ^(b)	September 30 ^(c)	December 31 ^(d)
Net sales	\$177.8	\$224.4	\$ 248.7	\$ 247.6
Gross profit	43.6	54.7	61.3	61.6
Income from continuing operations	7.2	11.5	12.5	29.3
Gain (loss) from discontinued operations and disposal, net	0.1	(0.1)	—	1.1
Net income	\$7.3	\$11.4	\$ 12.5	\$ 30.4
Diluted earnings per share:				
Earnings from continuing operations	\$0.12	\$0.19	\$ 0.21	\$ 0.48
Earnings (loss) from discontinued operations	0.00	0.00	—	0.02
Net earnings per share	\$0.12	\$0.19	\$ 0.21	\$ 0.50

Income from continuing operations includes pre-tax purchase accounting expenses, acquisition and (a) integration-related expenses, restructuring charges and executive severance costs of \$0.5 million, \$0.5 million, \$0.3 million and \$0.7 million, respectively.

(b) Income from continuing operations includes pre-tax purchase accounting expenses, acquisition and integration-related expenses, and restructuring charges of \$2.5 million, \$1.0 million and \$0.1 million, respectively.

Table of Contents

FEDERAL
SIGNAL
CORPORATION
AND
SUBSIDIARIES

NOTES TO
CONSOLIDATED
FINANCIAL
STATEMENTS —
(CONTINUED)

Income from continuing operations includes pre-tax purchase accounting expenses, acquisition and (c) integration-related expenses, and restructuring charges of \$1.3 million, \$0.7 million and \$0.1 million, respectively, as well as \$0.6 million of tax expense associated with a change in the enacted state tax rate in Illinois.

Income from continuing operations includes pre-tax purchase accounting expenses, acquisition and integration-related expenses, restructuring charges, pension settlement charges and hearing loss settlement charges (d) of \$0.5 million, \$0.5 million, \$0.1 million, \$6.1 million and \$1.5 million, respectively, as well as a \$20.8 million net benefit from special tax items, primarily represented by the Company's preliminary estimate of the impact of the 2017 Tax Act, including the effect of the reduction in the corporate tax rate in the U.S.

Table of Contents

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

(a) Evaluation of Disclosure Controls and Procedures

The Company carried out an evaluation, under the supervision and with the participation of its management, including the Chief Executive Officer and Chief Financial Officer, of the effectiveness of the design and operation of the Company's "disclosure controls and procedures" (as defined in the Exchange Act Rule 13a-15(e)) as of December 31, 2018.

Based on that evaluation, the Company's Chief Executive Officer and Chief Financial Officer concluded that the Company's disclosure controls and procedures were effective as of December 31, 2018.

(b) Management's Annual Report on Internal Control over Financial Reporting and Attestation Report of the Registered Public Accounting Firm

The Company's management is responsible for establishing and maintaining an adequate system of internal control over financial reporting, as defined in Exchange Act Rule 13a-15(f). Management conducted an assessment of the Company's internal control over financial reporting based on the framework established by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control — Integrated Framework (2013). Based on the assessment, management concluded that, as of December 31, 2018, the Company's internal control over financial reporting is effective.

Deloitte & Touche LLP, an independent registered public accounting firm, has audited the consolidated financial statements included in this Annual Report on Form 10-K and, as part of their audit, has issued its report, included herein, on the effectiveness of the Company's internal control over financial reporting. See "Report of Independent Registered Public Accounting Firm" under Item 8 of Part II of this Form 10-K.

(c) Changes in Internal Control over Financial Reporting

From time to time, the Company may make changes aimed at enhancing the effectiveness of the controls and to ensure that the systems evolve with the business. There were no changes in the Company's internal control over financial reporting that occurred during the Company's most recently completed fiscal quarter that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

Item 9B. Other Information.

On February 28, 2019, the Company issued a press release announcing its financial results for the three months and year ended December 31, 2018. The presentation slides for the 2018 fourth quarter earnings call were also posted on the Company's website at that time. The full text of the press release and earnings presentation is included as Exhibits 99.1 and 99.2, respectively, to this Form 10-K.

Table of Contents

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

A list of our executive officers and biographical information appears in Item 1 of Part I of this Form 10-K.

Information regarding directors and nominees for directors is set forth in the Company's definitive proxy statement for its 2019 Annual Meeting of Stockholders and is incorporated herein by reference.

Information regarding Compliance with Section 16(a) of the Exchange Act is set forth in the Company's 2019 definitive proxy statement under the caption "Section 16(a) Beneficial Ownership Reporting Compliance" and is incorporated herein by reference. Information regarding the (i) Audit Committee, (ii) Nominating and Governance Committee and (iii) Compensation and Benefits Committee of the Company's Board of Directors is set forth in the Company's 2019 definitive proxy statement under the caption "Information Concerning the Board" and is incorporated herein by reference.

The Company has adopted a code of ethics that applies to its principal executive officer, principal financial officer and principal accounting officer. This code of ethics and the Company's corporate governance policies are posted on the Company's website at www.federalsignal.com. The Company intends to satisfy its disclosure requirements regarding amendments to or waivers from its code of ethics by posting such information on this website. The charters of the (i) Audit Committee, (ii) Nominating and Governance Committee and (iii) Compensation and Benefits Committee of the Company's Board of Directors are available on the Company's website and are also available in print free of charge.

Item 11. Executive Compensation.

The information contained under the captions "Information Concerning the Board", "Compensation Committee Interlocks and Insider Participation", "Compensation Discussion and Analysis", "Compensation and Benefits Committee Report" and "Executive Compensation" of the Company's 2019 definitive proxy statement is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

Information regarding security ownership of (i) certain beneficial owners, (ii) all directors and nominees, (iii) named executive officers and (iv) directors and executive officers as a group is set forth in the Company's 2019 definitive proxy statement under the caption "Ownership of Our Common Stock" and is incorporated herein by reference.

Information regarding our equity compensation plans is set forth in the Company's 2019 definitive proxy statement under the caption "Equity Compensation Plan Information" and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

Information regarding certain relationships is hereby incorporated by reference from the Company's 2019 definitive proxy statement under the headings "Information Concerning the Board" and "Certain Relationships and Related Party Transactions."

Item 14. Principal Accountant Fees and Services.

Information regarding principal accountant fees and services is incorporated by reference from the Company's 2019 definitive proxy statement under the heading "Independent Registered Public Accounting Firm Fees and Services."

Table of Contents

PART IV

Item 15. Exhibits, Financial Statement Schedules.

1. Financial Statements

The following consolidated financial statements of the Company and the “Report of the Independent Registered Public Accounting Firm” contained under Item 8 of Part II this Form 10-K are incorporated herein by reference:

- (a) Consolidated Statements of Operations for the Years Ended December 31, 2018, 2017 and 2016;
- (b) Consolidated Statements of Comprehensive Income for the Years Ended December 31, 2018, 2017 and 2016;
- (c) Consolidated Balance Sheets as of December 31, 2018 and 2017;
- (d) Consolidated Statements of Cash Flows for the Years Ended December 31, 2018, 2017 and 2016;
- (e) Consolidated Statements of Stockholders’ Equity for the Years Ended December 31, 2018, 2017 and 2016; and
- (f) Notes to Consolidated Financial Statements.

2. Financial Statement Schedules

Schedule II — Valuation and Qualifying Accounts of the Company for the three years ended December 31, 2018 is filed as a part of this Annual Report in response to Item 15(a)(2):

All other schedules for which provision is made in the applicable accounting regulations of the Securities and Exchange Commission are not required under the related instructions or are inapplicable, and therefore, have been omitted.

3. Exhibits

See Exhibit Index.

Item 16. Form 10-K Summary.

None.

Table of Contents

SCHEDULE II
 FEDERAL SIGNAL CORPORATION AND SUBSIDIARIES

Valuation and Qualifying Accounts ^(a)

For the years ended December 31, 2018, 2017 and 2016

(in millions)	Balance at Beginning of Year	Additions			Deductions ^(e)	Balance at End of Year
		Charged to Costs and Expenses ^(c)	Charged to Other Accounts ^(b)	Charged to		
Allowance for doubtful accounts:						
Year Ended December 31, 2018	\$ 1.1	\$ 1.0	\$ —	\$ (0.5)	)	\$ 1.6
Year Ended December 31, 2017	0.8	0.6	—	(0.3)	)	1.1
Year Ended December 31, 2016	0.8	0.4	—	(0.4)	)	0.8
Income tax valuation allowances:						
Year Ended December 31, 2018	\$ 10.6	\$—	\$ (1.2)	)	\$ —	\$ 9.4
Year Ended December 31, 2017	7.7	2.2	1.2	(0.5)	)	10.6
Year Ended December 31, 2016	5.9	1.4	0.5	(0.1)	)	7.7

(a) Relates to continuing operations only.

(b) The amount reflected in the year ended December 31, 2018 represents amounts recognized in Accumulated other comprehensive loss and other adjustments that had no net impact on Income tax expense in the year.

(c) The amount reflected in the year ended December 31, 2017 represents amounts recognized in Accumulated other comprehensive loss and other adjustments, such as the recognition of additional valuation allowance associated with the revaluation of state deferred tax assets as a result of the 2017 Tax Act, that had no net impact on Income tax expense in the year.

(d) The \$0.5 million reflected in the year ended December 31, 2016 represents amounts reclassified from discontinued operations during the year.

(e) Represents amounts written off, net of related recoveries.

Table of Contents

EXHIBIT INDEX

The following exhibits, other than those incorporated by reference, have been included in the Company's Form 10-K filed with the Securities and Exchange Commission.

3. a. Restated Certificate of Incorporation of the Company. Incorporated by reference to Exhibit 3.1 to the Company's Form 8-K filed April 30, 2010.
- b. Amended and Restated By-Laws of the Company. Incorporated by reference to Exhibit 3.1 to the Company's Form 8-K filed February 9, 2016.
10. a. Supplemental Pension Plan. Incorporated by reference to Exhibit 10.C to the Company's Form 10-K for the year ended December 31, 1995.
- * b. Executive Disability, Survivor and Retirement Plan. Incorporated by reference to Exhibit 10.D to the Company's Form 10-K for the year ended December 31, 1995.
- c. Savings Restoration Plan, as amended and restated January 1, 2007. Incorporated by reference to Exhibit 10.FF to the Company's Form 10-K for the year ended December 31, 2008.
- d. First Amendment of the Federal Signal Corporation Savings Restoration Plan. Incorporated by reference to Exhibit 10.MM to the Company's Form 10-K for the year ended December 31, 2008.
- e. Second Amendment to Federal Signal Corporation Savings Restoration Plan. Incorporated by reference to Exhibit 10.NN to the Company's Form 10-K for the year ended December 31, 2008.
- f. * Third Amendment to Federal Signal Corporation Savings Restoration Plan. Incorporated by reference to Exhibit 10.OO to the Company's Form 10-K for the year ended December 31, 2008.
- g. Executive General Severance Plan, as amended and restated August 2012. Incorporated by reference to Exhibit 10.1 to the Company's Form 10-Q for the quarter ended June 30, 2012.
- h. Form of 2008 Executive Change-In-Control Severance Agreement (Tier 1) with certain executive officers. Incorporated by reference to Exhibit 10.HH to the Company's Form 10-K for the year ended December 31, 2008.
- * i. Form of 2008 Executive Change-In-Control Severance Agreement (Tier 2) with certain executive officers. Incorporated by reference to Exhibit 10.II to the Company's Form 10-K for the year ended December 31, 2008.
- j. * Form of 2010 Executive Change-In-Control Severance Agreement with certain executive officers (Tier 1). Incorporated by reference to Exhibit 10.1 to the Company's Form 10-Q for the quarter ended March 31, 2010.
- k. Form of 2010 Executive Change-In-Control Severance Agreement with certain executive officers (Tier 2). Incorporated by reference to Exhibit 10.2 to the Company's Form 10-Q for the quarter ended March 31, 2010.
- * l. Federal Signal Corporation Executive Incentive Performance Plan, as amended and restated. Incorporated by reference to Appendix C to the Company's Definitive Proxy Statement filed on Schedule 14A filed March 25, 2010.
- m. Form of Nonqualified Stock Option Award Agreement - U.S. Incorporated by reference to Exhibit 10.1 to the Company's Form 10-Q for the quarter ended March 31, 2015.
- * n. Form of Nonqualified Stock Option Award Agreement - Non-U.S. Incorporated by reference to Exhibit 10.2 to the Company's Form 10-Q for the quarter ended March 31, 2015.
- o. Form of Performance Share Unit Award Agreement - U.S. Incorporated by reference to Exhibit 10.3 to the Company's Form 10-Q for the quarter ended March 31, 2015.
- * p. Form of Performance Share Unit Award Agreement - Non-U.S. Incorporated by reference to Exhibit 10.4 to the Company's Form 10-Q for the quarter ended March 31, 2015.
- q. Form of Nonqualified Stock Option Award Agreement - U.S. Incorporated by reference to Exhibit 10.1 to the Company's Form 10-Q for the quarter ended June 30, 2015.
- * r. Form of Restricted Stock Award Agreement - U.S. Incorporated by reference to Exhibit 10.2 to the Company's Form 10-Q for the quarter ended June 30, 2015.
- s. * Form of Nonqualified Stock Option Award Agreement. Incorporated by reference to Exhibit 10.1 to the Company's Form 10-Q for the quarter ended June 30, 2016.

- t. * Form of Performance Share Unit Award Agreement - Non-U.S. Incorporated by reference to Exhibit 10.2 to the Company's Form 10-Q for the quarter ended June 30, 2016.
- u. Form of Performance Share Unit Award Agreement - U.S. Incorporated by reference to Exhibit 10.3 to the
* Company's Form 10-Q for the quarter ended June 30, 2016.
- v. Form of Restricted Stock Award Agreement - U.S. Incorporated by reference to Exhibit 10.4 to the Company's
* Form 10-Q for the quarter ended June 30, 2016.
- w. Form of Restricted Stock Unit Award Agreement - Non-U.S. Incorporated by reference to Exhibit 10.5 to the
* Company's Form 10-Q for the quarter ended June 30, 2016.

Table of Contents

- x. * Form of Nonqualified Stock Option Award Agreement. Incorporated by reference to Exhibit 10.4 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- y. * Form of Performance Share Unit Award Agreement - Non-U.S. Incorporated by reference to Exhibit 10.5 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- z. * Form of Performance Share Unit Award Agreement - U.S. Incorporated by reference to Exhibit 10.6 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- aa. * Form of Restricted Stock Award Agreement - U.S. Incorporated by reference to Exhibit 10.7 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- bb. * Form of Restricted Stock Unit Award Agreement - Non-U.S. Incorporated by reference to Exhibit 10.8 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- cc. * Federal Signal Corporation 2015 Executive Incentive Compensation Plan. Incorporated by reference to Appendix B to the Company's Definitive Proxy Statement filed on Schedule 14A filed March 18, 2015. Share Sale and Purchase Agreement dated as of December 11, 2015, by and among Morita Holdings Corporation, the Company and certain of its subsidiaries identified on the signature pages thereto. Incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated December 11, 2015.
- ee. * Federal Signal Corporation Retirement Savings Plan, as amended and restated effective as of January 1, 2015. Incorporated by reference to Exhibit 10.r to the Company's Form 10-K for the year ended December 31, 2015.
- ff. * Form of Director Distribution Election. Incorporated by reference to Exhibit 10.s to the Company's Form 10-K for the year ended December 31, 2015.
- gg. * Separation Agreement and General Release, effective January 7, 2016, by and between Bryan L. Boettger and the Company. Incorporated by reference to Exhibit 99.1 to the Company's Current Report on Form 8-K dated January 11, 2016.
- hh. * Amended and Restated Credit Agreement, dated as of January 27, 2016, by and among the Company and certain of its foreign subsidiaries, as Borrowers, the Lenders referred to therein, as Lenders, Wells Fargo Bank, National Association, as Administrative Agent, Swingline Lender and Issuing Lender, JPMorgan Chase Bank, N.A., as Syndication Agent, KeyBank National Association, as Documentation Agent, and Wells Fargo Securities, LLC and J.P. Morgan Securities LLC, as Joint Lead Arrangers and Joint Bookrunners. Incorporated by reference to Exhibit 10.1 to the Company's Form 8-K filed February 2, 2016.
- ii. * Asset and Share Purchase Agreement, dated as of February 29, 2016, by and among FST Canada Inc., the Company, Joe Johnson Equipment Inc. and the Shareholders of Seller named therein. Incorporated by reference to Exhibit 10.1 to the Company's Form 8-K filed March 3, 2016.
- jj. * Asset Purchase Agreement, dated as of February 29, 2016, by and among Vactor Manufacturing Inc., the Company, Joe Johnson Equipment (USA) Inc. and the Shareholders of Seller named therein. Incorporated by reference to Exhibit 10.2 to the Company's Form 8-K filed March 3, 2016.
- kk. * Short Term Incentive Bonus Plan. Incorporated by reference to Exhibit 10.3 to the Company's Form 10-Q for the quarter ended March 31, 2016.
- ll. * Form of Restricted Stock Unit and Dividend Equivalent – Award Agreement (Directors). Incorporated by reference to Exhibit 10.4 to the Company's Form 10-Q for the quarter ended March 31, 2016.
- mm. * Joint Issues and Reverse Earn Out Payment Agreement, dated as of June 3, 2016, by and among the Company, FST Canada Inc., Joe Johnson Equipment LLC, Vactor Manufacturing Inc., Joe Johnson Equipment Inc., JJE Limited Partnership, Joe Johnson Equipment (USA) Inc., and the Shareholders of Seller named therein. Incorporated by reference to Exhibit 10.1 to the Company's Form 8-K filed June 3, 2016.
- nn. * Separation Agreement and General Release, effective January 8, 2017, by and among Dennis J. Martin and Federal Signal Corporation. Incorporated by reference to Exhibit 99.1 to the Company's Form 8-K filed January 11, 2017.
- oo. * Separation Agreement and General Release, effective April 3, 2017, by and between Brian S. Cooper and Federal Signal Corporation. Incorporated by reference to Exhibit 10.1 to the Company's Form 8-K filed April 6,

2017.

- pp. Employment Letter executed March 31, 2017 between Federal Signal Corporation and David G. Martin.
- * Incorporated by reference to Exhibit 10.2 to the Company's Form 8-K filed April 6, 2017.
- qq. Stock Purchase Agreement, dated as of May 8, 2017, by and between GenNx/TBEI Holdings, LLC and Federal Signal Corporation. Incorporated by reference to Exhibit 10.1 to the Company's Form 8-K filed May 8, 2017.
- rr. First Amendment to Amended and Restated Credit Agreement, dated as of June 2, 2017, by and among Federal Signal Corporation and certain of its foreign subsidiaries, Wells Fargo Bank, National Association, and the Lenders party thereto. Incorporated by reference to Exhibit 10.1 to the Company's Form 8-K filed June 2, 2017.

90

Table of Contents

- ss.* Employment Letter dated as of May 5, 2017, by and between Federal Signal Corporation and Robert E. Fines. Incorporated by reference to Exhibit 10.3 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- tt.* Performance Share Unit Award Agreement dated as of July 25, 2017, by and between Federal Signal Corporation and Robert E. Fines. Incorporated by reference to Exhibit 10.9 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- uu.* First Amendment to the Federal Signal Corporation 2005 Executive Incentive Compensation Plan (2010 Restatement), dated as of March 26, 2015. Incorporated by reference to Exhibit 10.10 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- vv.* Second Amendment to the Federal Signal Corporation 2005 Executive Incentive Compensation Plan (2010 Restatement), dated as of July 24, 2017. Incorporated by reference to Exhibit 10.11 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- ww.* First Amendment to the Federal Signal Corporation Executive Incentive Performance Plan, as amended and restated, dated as of July 24, 2017. Incorporated by reference to Exhibit 10.12 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- xx.* First Amendment to the Federal Signal Corporation 2015 Executive Incentive Compensation Plan dated as of July 24, 2017. Incorporated by reference to Exhibit 10.13 to the Company's Form 10-Q for the quarter ended June 30, 2017.
- yy.* Agreement and General Release, executed October 30, 2017, between Federal Signal Corporation and David G. Martin. Incorporated by reference to Exhibit 10.1 to the Company's Form 10-Q for the quarter ended September 30, 2017.
- zz.* Employment Letter executed December 15, 2017, between Federal Signal Corporation and Mark D. Weber. Incorporated by reference to Exhibit 10.1 to the Company's Form 8-K filed December 19, 2017.
- aaa.* Employment Letter executed December 18, 2017, between Federal Signal Corporation and Samuel E. Miceli. Incorporated by reference to Exhibit 10.2 to the Company's Form 8-K filed December 19, 2017.
- bbb.* Amended and Restated Non-Competition and Severance Agreement between the Crysteel Manufacturing, Inc. and Robert Fines dated September 30, 2015. Incorporated by reference to Exhibit 10.1 to the Company's Form 10-Q for the quarter ended March 31, 2018.
- ccc.* First Amendment to the Amended and Restated Non-Competition and Severance Agreement between Crysteel Manufacturing, Inc. and Robert Fines dated November 10, 2017. Incorporated by reference to Exhibit 10.2 to the Company's Form 10-Q for the quarter ended March 31, 2018.
- ddd.* Form of Nonqualified Stock Option Award Agreement. Incorporated by reference to Exhibit 10.1 to the Company's Form 10-Q for the quarter ended June 30, 2018.
- eee.* Form of Performance Share Unit Award Agreement - Non-U.S. Incorporated by reference to Exhibit 10.2 to the Company's Form 10-Q for the quarter ended June 30, 2018.
- fff.* Form of Performance Share Unit Award Agreement - U.S. Incorporated by reference to Exhibit 10.3 to the Company's Form 10-Q for the quarter ended June 30, 2018.
- ggg.* Form of Restricted Stock Award Agreement - U.S. Incorporated by reference to Exhibit 10.4 to the Company's Form 10-Q for the quarter ended June 30, 2018.
- hhh.* Form of Restricted Stock Unit Award Agreement - Non-U.S. Incorporated by reference to Exhibit 10.5 to the Company's Form 10-Q for the quarter ended June 30, 2018.
- iii.* First Amendment to the Federal Signal Corporation Retirement Savings Plan, as amended and restated as of January 1, 2015. Incorporated by reference to Exhibit 10.6 to the Company's Form 10-Q for the quarter ended June 30, 2018.
- jjj.* Amended and Restated Performance Share Unit Award Agreement, by and between the Company and Robert E. Fines, dated December 20, 2018. Incorporated by reference to Exhibit 10.1 to the Company's Form 8-K filed December 21, 2018.

- kkk. Second Amendment to Amended and Restated Credit Agreement, dated December 20, 2018, by and among Federal Signal Corporation and certain of its foreign subsidiaries, Wells Fargo Bank, National Association, and the Lenders party thereto.
- 14. Code of Ethics for Chief Executive Officer and Senior Financial Officers, as amended. Incorporated by reference to Exhibit 14 to the Company's Form 10-K for the year ended December 31, 2003.
- 21. Subsidiaries of the Registrant.
- 23. Consent of Independent Registered Public Accounting Firm.
- 31.1 CEO Certification under Section 302 of the Sarbanes-Oxley Act.
- 31.2 CFO Certification under Section 302 of the Sarbanes-Oxley Act.
- 32.1 CEO Certification of Periodic Report under Section 906 of the Sarbanes-Oxley Act.
- 32.2 CFO Certification of Periodic Report under Section 906 of the Sarbanes-Oxley Act.
- 99.1 Fourth Quarter Financial Results Press Release dated February 28, 2019.

91

Table of Contents

99.2 Fourth Quarter Earnings Call Presentation Slides.

101.INS XBRL Instance Document.

101.SCH XBRL Taxonomy Extension Schema Document.

101.CAL XBRL Taxonomy Calculation Linkbase Document.

101.DEF XBRL Taxonomy Extension Definition Linkbase Document.

101.LAB XBRL Taxonomy Label Linkbase Document.

101.PRE XBRL Taxonomy Presentation Linkbase Document.

* Management contract or compensatory plan or arrangement required to be filed as an exhibit pursuant to Item 15(a)(3) of Form 10-K.

