



Surge Damage Survey Results – Wave 2

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Prepared for the Low Voltage Surge Protective Devices Section (5-VS)

Steven K. Wilcox
NEMA/Business Information Services

Summary

As a follow-up to a previous study the Low Voltage Surge Protective Devices Section's Industry Development Committee worked with NEMA/BIS to modify the previously used survey instrument that was administered to maintenance and facilities managers for gathering data on surge damage that occurred at properties they oversee. NEMA engaged the services of the same third party sample supplier that was used in the prior study. For this iteration, we were able to obtain 100 completed surveys from the targeted population. Following this brief summary of the results, you will find tables and charts that provide full detail of the responses received.

Respondents were asked if they use surge protection other than wall or cord connected at their facilities and were provided examples of such surge protectors. Eighty-four percent of our panelists indicated that they do have and use surge protection other than wall or cord connected.

A plurality (48%) of respondents noted that their facility had experienced unexplained process interruptions. Catastrophic failure or damage of electrical or electronic equipment due to a lightning event or voltage surge and premature failure of electrical or electronic equipment were both frequently reported (41%) events experienced by our panelists. More than a third (38%) noted the occurrence of lockup of computer or industrial process systems.

Although a majority (52%) experienced no equipment damage or had only one such incident in the past three years, a significant number (75%) experienced one or more incidents of damage because of voltage surges during that time. So even though the frequency of equipment damage arising from voltage surges is relatively low, most property managers have had to deal materially with surge damage. For most respondents (61%), it cost less than \$10,000 to repair the damage resulting from voltage surges, but a sizable number (16%) reported damage costing in excess of \$150,000 to fix. All respondents who reported damaged equipment from voltage surges also noted experiencing at least some downtime as a result. As reported by 59% of our panel members, the typical amount of lost time ranged between one and 12 hours. Even more troubling however, 13% reported downtime of greater than 48 hours. The value of that lost production was normally distributed between less than \$1000 and more than \$100,000 among responses, with the bulk of lost production (48%) falling in a range between \$5,000 and \$50,000.

Nearly three-fourths of those reporting losses because of voltage surges indicated that at least some portion of those losses was covered by insurance. On average insurers covered 65% of total equipment loss costs, 46% of total downtime costs, and 42% of the total costs of lost production. In all three cases some respondents' insurance covered 100% of the loss incurred.

Survey participants were given examples of injuries that may happen as a result of voltage surges. With those examples in mind, participants were then asked if anyone had been injured, either directly or indirectly, as a result of the voltage surge at their facility. The vast majority of respondents (89%) reported no injuries as a result of the voltage surge.

Nearly 95% of those who reported having experienced a surge event resulting in equipment damage indicated that they subsequently purchased surge protection. Virtually all of those who did so, purchased immediately or within three months of the event.




Please refer to the charts at the end of this report to gain a better understanding of the demographics of those surveyed. A brief review shows that one third of respondents manage facilities involved in manufacturing, 15% are involved in professional business services, and a notable proportion oversee locations engaged in retail and transportation/warehousing operations. The location of respondents by region matches quite well with baseline data from the U.S. Census Bureau. The only noticeable discrepancy from those baseline proportions is a slight overrepresentation of respondents from Northeastern states and a slight underrepresentation of those from the Midwest.

#	Answer	Bar	Response	%
1	Employed full time		83	83.0%
2	Employed part time		0	0.0%
3	Self-employed / Business owner		17	17.0%
4	Unemployed / Looking for work		0	0.0%
5	Student		0	0.0%
6	Homemaker		0	0.0%
7	Retired		0	0.0%
8	Other		0	0.0%
	Total		100	100.0%

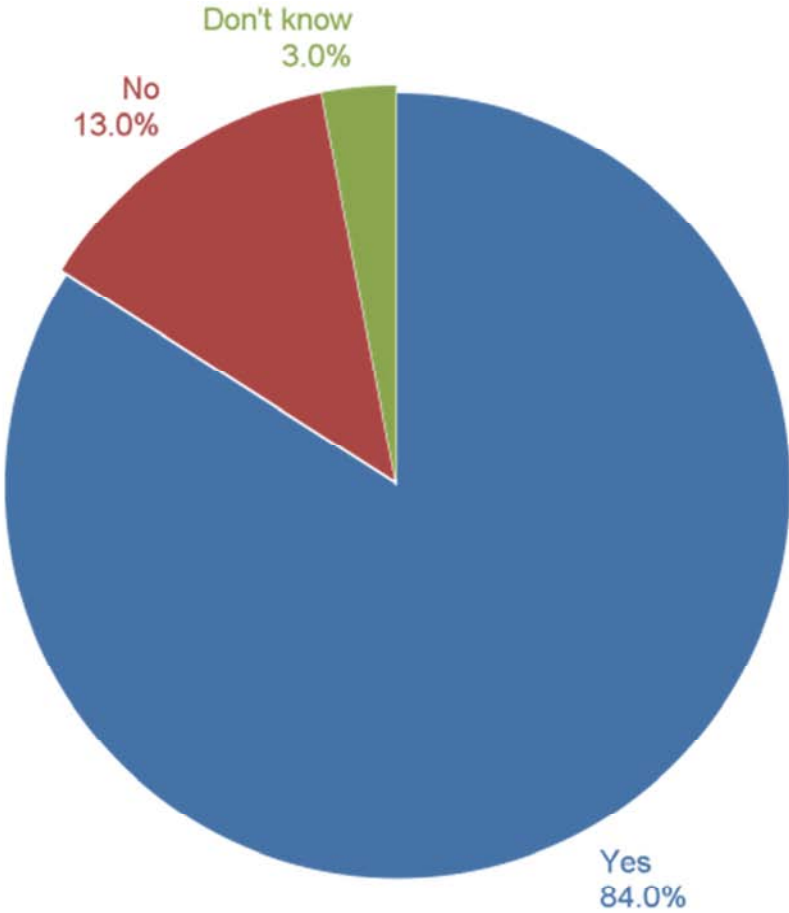
Please indicate your occupation:

#	Answer	Bar	Response	%
1	Management Occupations		49	49.0%
2	Business and Financial Operations Occupations		0	0.0%
3	Computer and Mathematical Occupations		0	0.0%
4	Architecture and Engineering Occupations		0	0.0%
5	Life, Physical, and Social Science Occupations		0	0.0%
6	Community and Social Service Occupations		0	0.0%
7	Legal Occupations		0	0.0%
8	Education, Training, and Library Occupations		0	0.0%
9	Arts, Design, Entertainment, Sports, and Media Occupations		0	0.0%
10	Healthcare Practitioners and Technical Occupations		0	0.0%
11	Healthcare Support Occupations		0	0.0%
12	Protective Service Occupations		0	0.0%
13	Food Preparation and Serving Related Occupations		0	0.0%
14	Building and Grounds Cleaning and Maintenance Occupations		21	21.0%
15	Personal Care and Service Occupations		0	0.0%
16	Sales and Related Occupations		0	0.0%
17	Office and Administrative Support Occupations		0	0.0%
18	Farming, Fishing, and Forestry Occupations		0	0.0%
19	Construction and Extraction Occupations		0	0.0%
20	Installation, Maintenance, and Repair Occupations		17	17.0%
21	Production Occupations		0	0.0%
22	Transportation and Material Moving Occupations		0	0.0%
23	Military Specific Occupations		0	0.0%
24	Other		13	13.0%
	Total		100	100.0%

In carrying out the responsibilities of your occupation, does your role involve any of the following? (select all that apply)

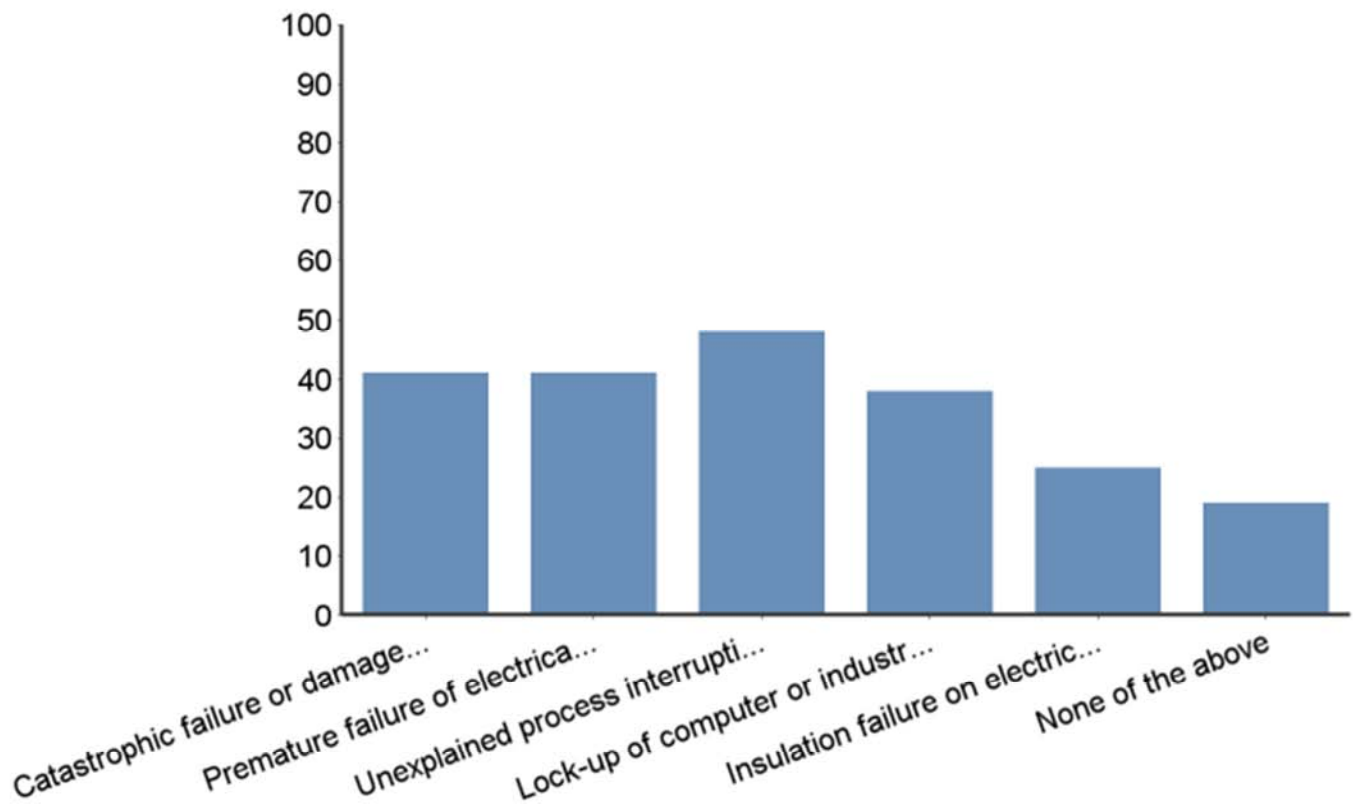
#	Answer	Bar	Response	%
1	Facilities management		57	57.0%
2	Maintenance management		63	63.0%
3	Property management		49	49.0%
4	None of the above		0	0.0%
	Total		169	100.0%

Do you currently have and use surge protection other than wall or cord connected surge protection? This type of surge protection would include, for example, permanently connected surge protectors installed at the main electrical panel, distribution panels or individual equipment.



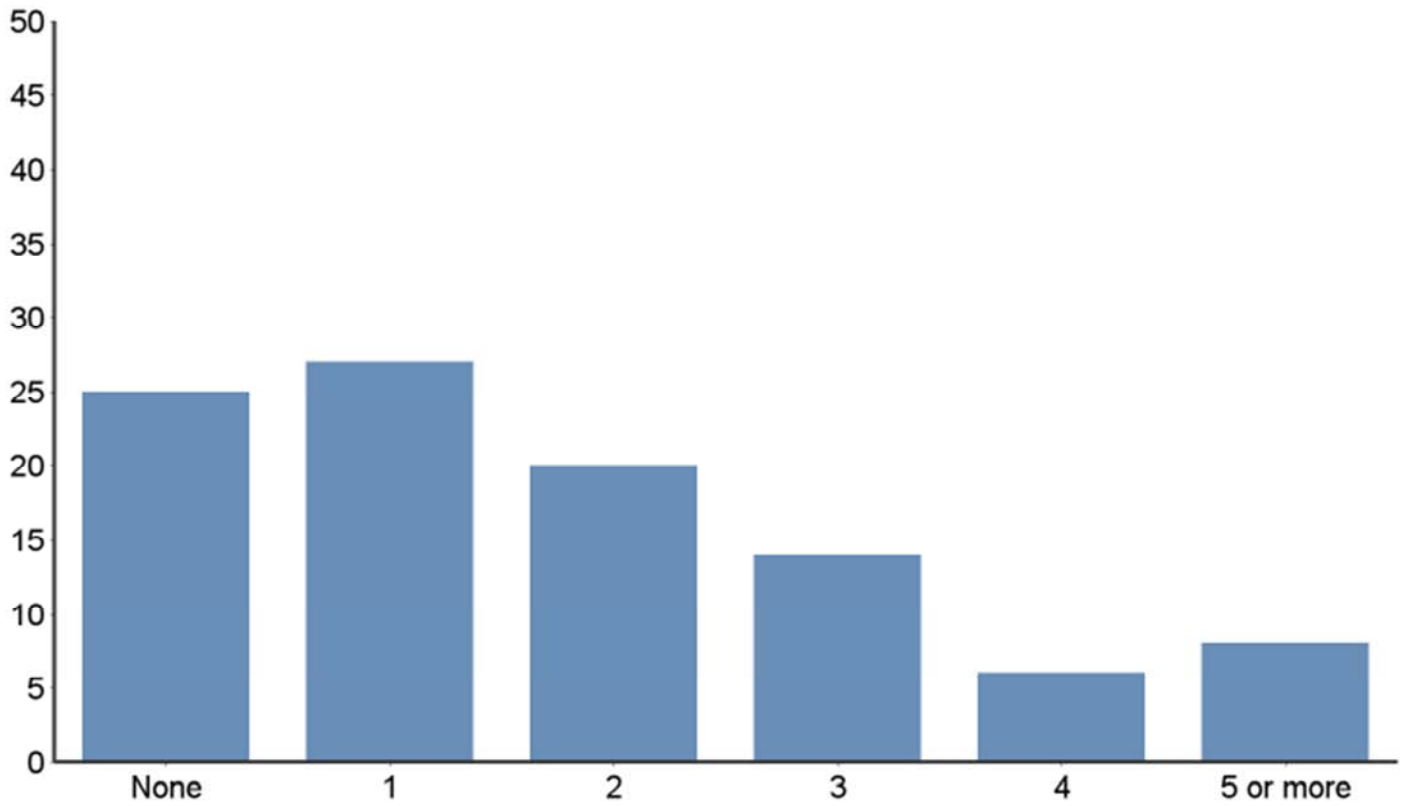
#	Answer	Bar	Response	%
1	Yes		84	84.0%
2	No		13	13.0%
3	Don't know		3	3.0%
	Total		100	100.0%

Have you ever experienced any of the following at your current facility? (select all that apply)



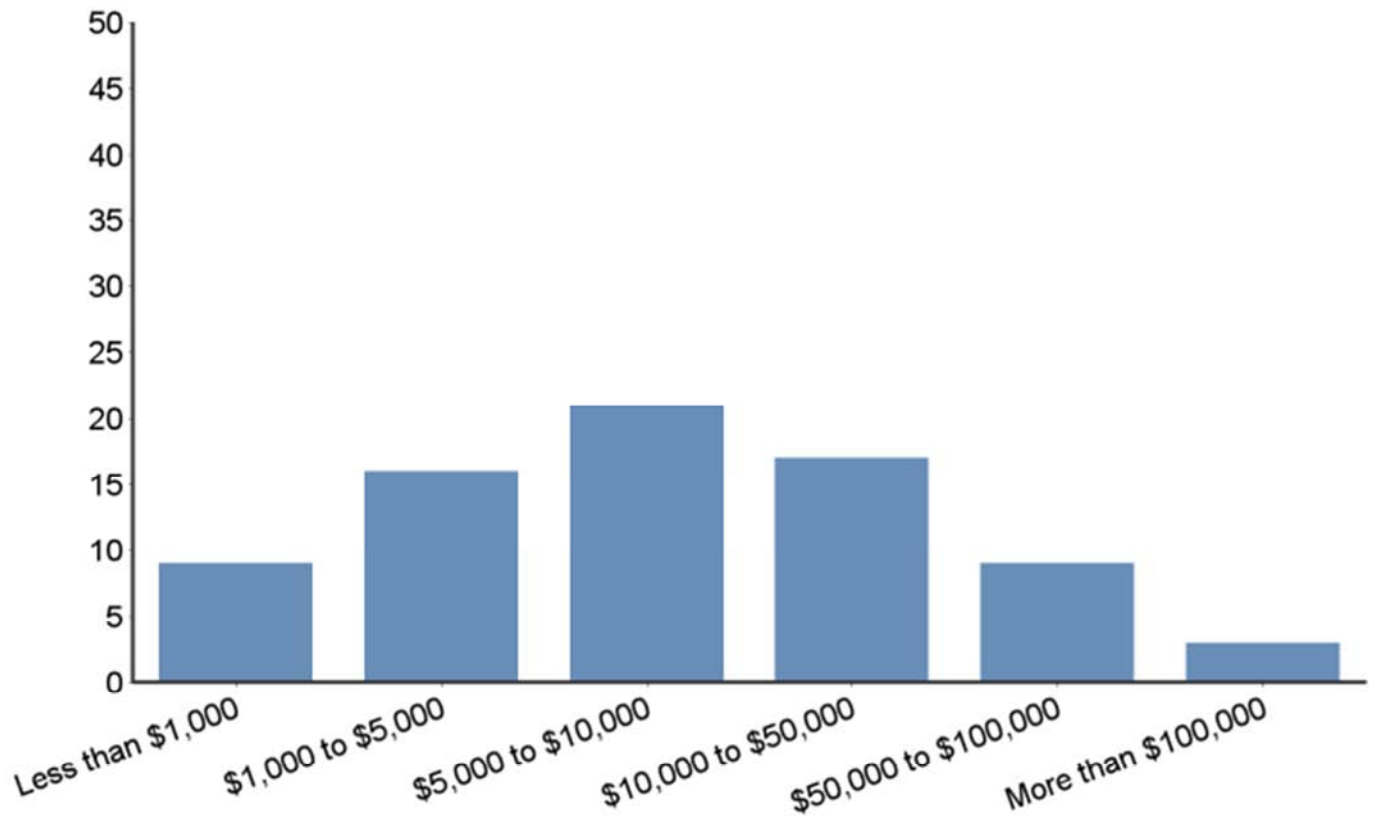
#	Answer	Bar	Response	%
1	Catastrophic failure or damage of electrical or electronic equipment due to a lightning event or voltage surge		41	41.0%
2	Premature failure of electrical or electronic equipment		41	41.0%
3	Unexplained process interruption		48	48.0%
4	Lock-up of computer or industrial process systems		38	38.0%
5	Insulation failure on electric motors or transformers		25	25.0%
6	None of the above		19	19.0%
	Total		212	100.0%







At your current place of business, how many times have you experienced equipment damage from voltage surges due to lightning or other sources in the past 3 years?



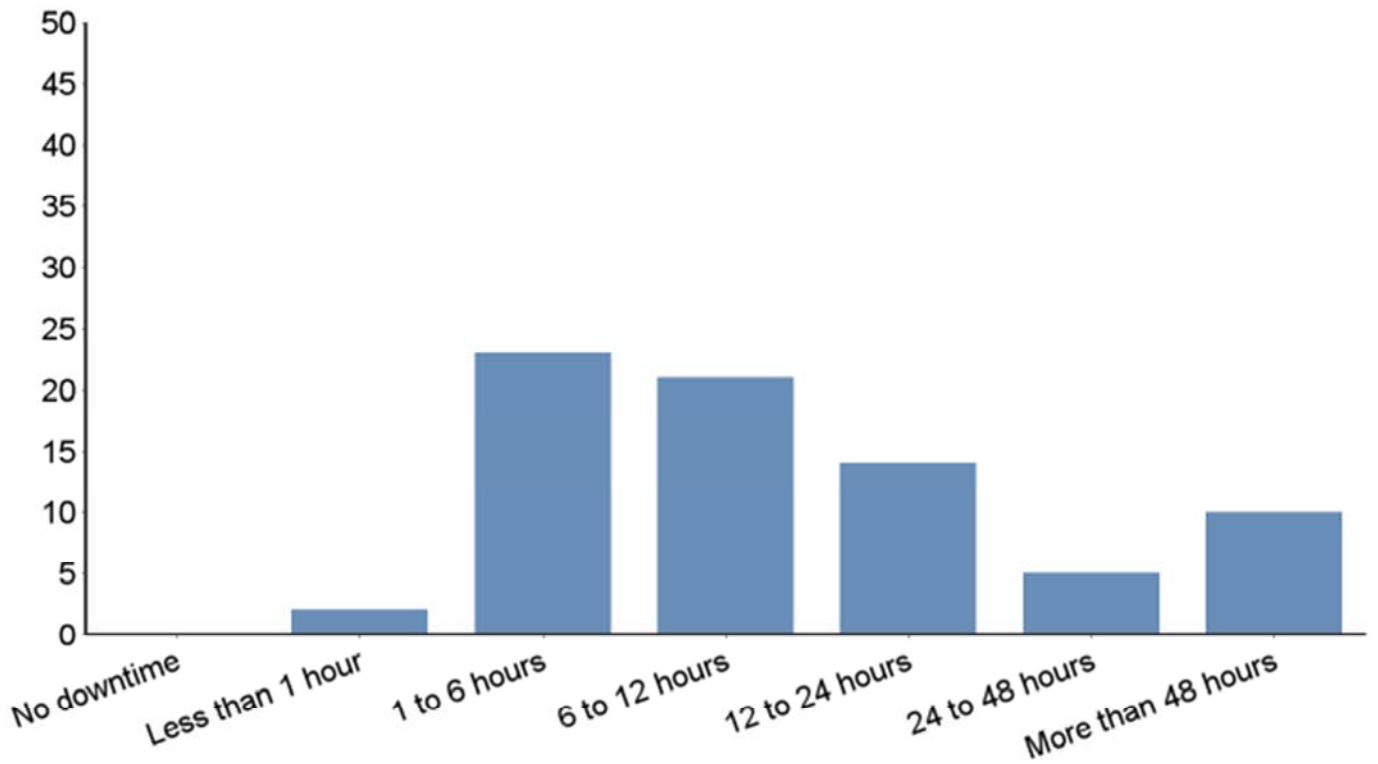
#	Answer	Bar	Response	%
1	None		25	25.0%
2	1		27	27.0%
3	2		20	20.0%
4	3		14	14.0%
5	4		6	6.0%
6	5 or more		8	8.0%
	Total		100	100.0%

What was the total cost to repair or replace the equipment damaged because of voltage surges?



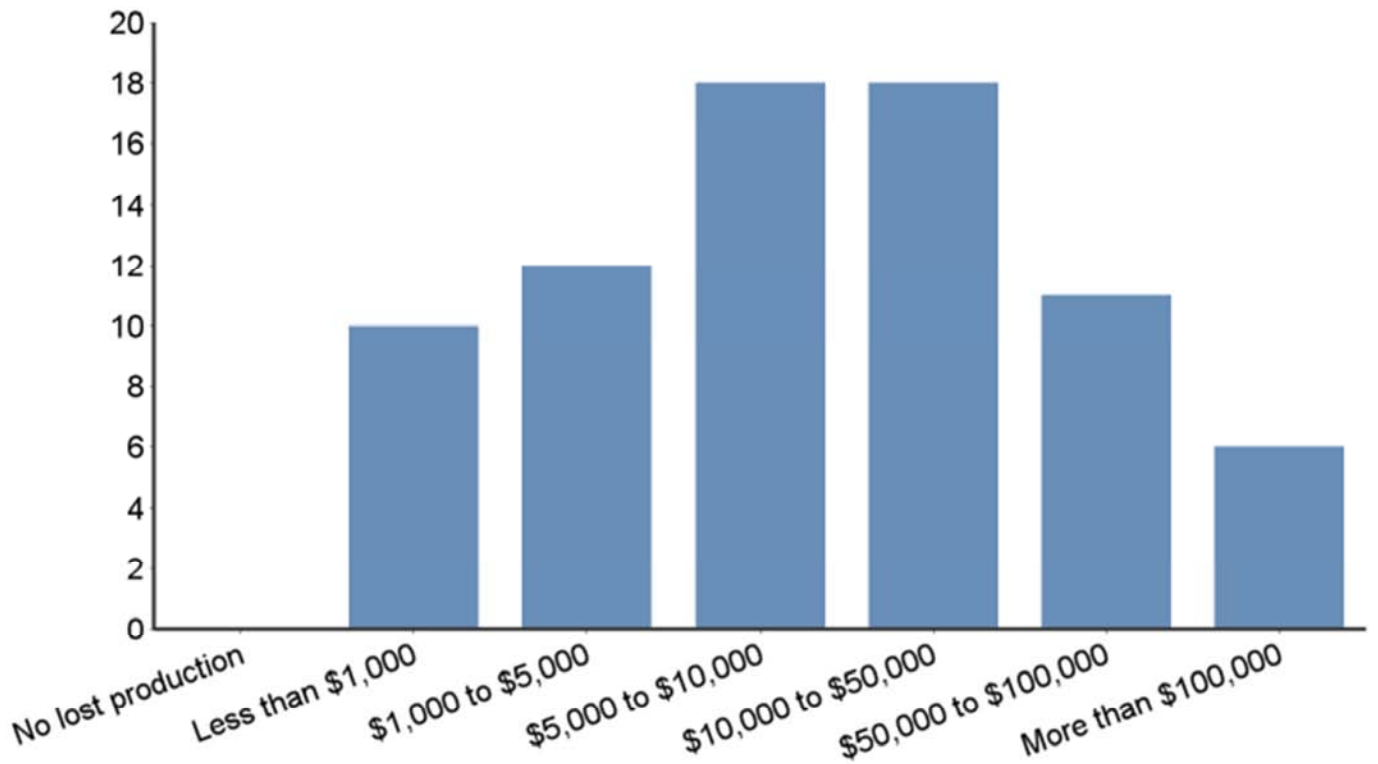
#	Answer	Bar	Response	%
1	Less than \$1,000		9	12.0%
2	\$1,000 to \$5,000		16	21.3%
3	\$5,000 to \$10,000		21	28.0%
4	\$10,000 to \$50,000		17	22.7%
5	\$50,000 to \$100,000		9	12.0%
6	More than \$100,000		3	4.0%
	Total		75	100.0%

What was the total amount of downtime that resulted from voltage surges?



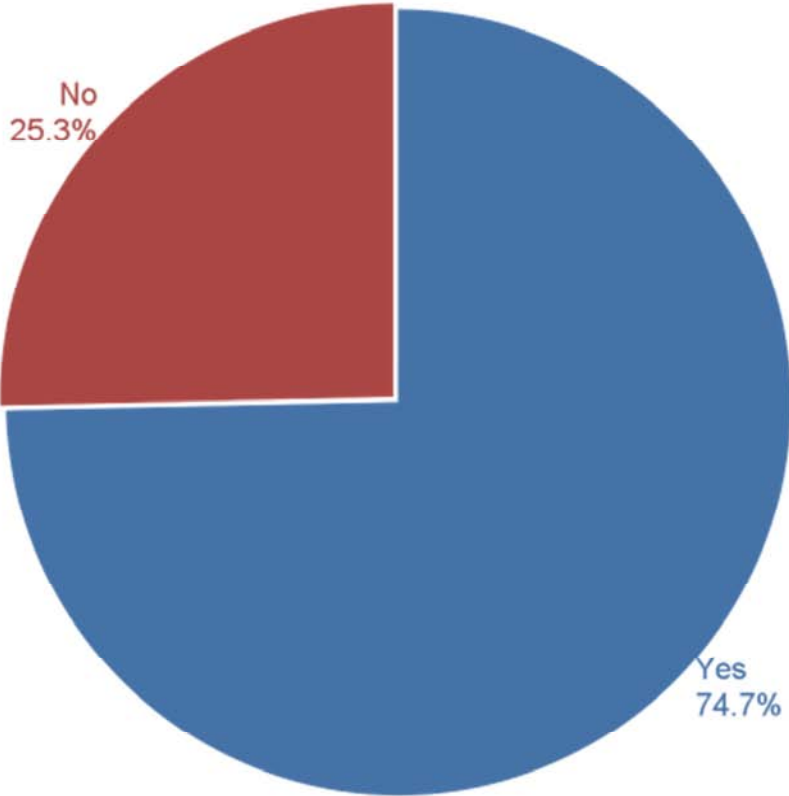
#	Answer	Bar	Response	%
1	No downtime		0	0.0%
2	Less than 1 hour	■	2	2.7%
3	1 to 6 hours	■■■■■■■■■■■■■■■■■■■■	23	30.7%
4	6 to 12 hours	■■■■■■■■■■■■■■■■■■	21	28.0%
5	12 to 24 hours	■■■■■■■■■■■■■■■■	14	18.7%
6	24 to 48 hours	■■■■	5	6.7%
7	More than 48 hours	■■■■■■■■	10	13.3%
	Total		75	100.0%

What would you estimate was the total value of lost production that resulted from voltage surges?















#	Answer	Bar	Response	%
1	No lost production		0	0.0%
2	Less than \$1,000		10	13.3%
3	\$1,000 to \$5,000		12	16.0%
4	\$5,000 to \$10,000		18	24.0%
5	\$10,000 to \$50,000		18	24.0%
6	\$50,000 to \$100,000		11	14.7%
7	More than \$100,000		6	8.0%
	Total		75	100.0%

Were any of the losses your place of business experienced covered by insurance?



#	Answer	Bar	Response	%
1	Yes	<div style="width: 74.7%; height: 10px; background-color: #4F81BD;"></div>	56	74.7%
2	No	<div style="width: 25.3%; height: 10px; background-color: #4F81BD;"></div>	19	25.3%
	Total		75	100.0%

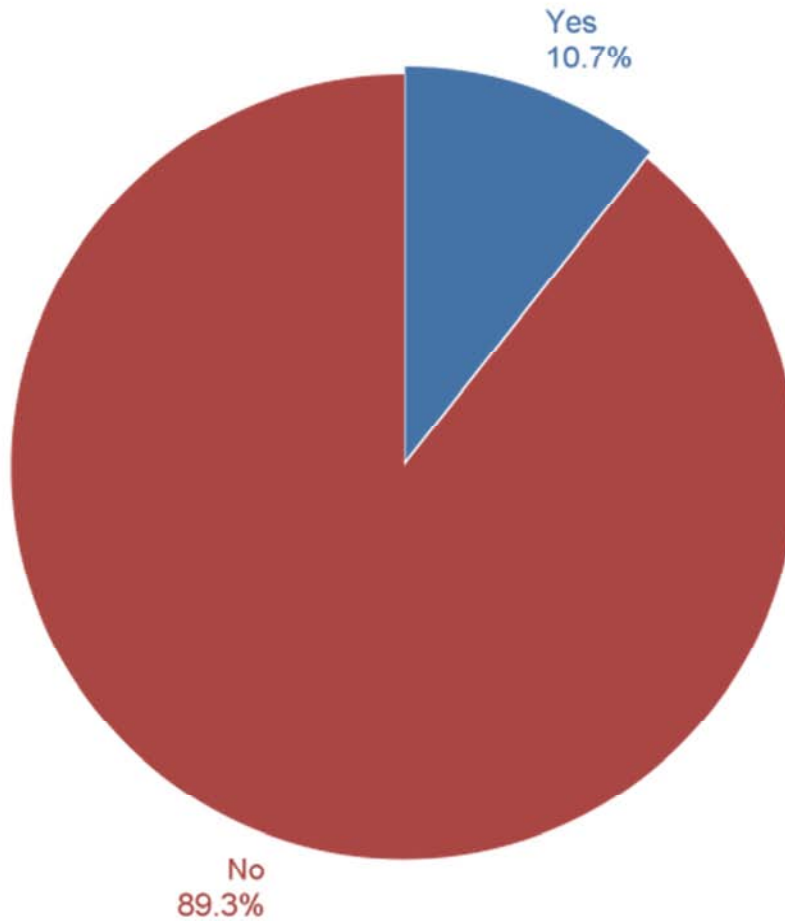
Have you experienced damage or loss of function on any of the following types of equipment because of voltage surges? (select all that apply)

#	Answer	Bar	Response	%
1	Smoke detector		26	34.7%
2	CO2 detector		14	18.7%
3	Fire alarm system		31	41.3%
4	Security system		37	49.3%
5	Ground fault circuit interrupters		17	22.7%
6	Emergency lighting		24	32.0%
7	Emergency generators or back-up power		25	33.3%
8	Any other life safety equipment (please describe)		3	4.0%
9	No life safety equipment was damaged or lost function		11	14.7%
10	Fire pumps		9	12.0%
11	Elevators or escalators		18	24.0%
12	Safety interlocking systems on machines		20	26.7%
	Total		235	100.0%

When considering your answer to the following question, please bear in mind the following examples of injuries that may happen as a result of a voltage surge:

- A voltage surge resulted in failure of a smoke detector or fire alarm and an individual suffered smoke inhalation
- Emergency lighting circuits were damaged by a surge and an individual fell or suffered abrasions while exiting the building in the dark
- Safety interlocking circuitry on machinery was damaged due to a surge and the operator was injured
- Etc.

Has anyone been injured, either directly or indirectly, as a result of a voltage surge?



#	Answer	Bar	Response	%
1	Yes		8	10.7%
2	No		67	89.3%
	Total		75	100.0%

Please describe any such incidents, in which someone was injured as a result of a voltage surge, in detail.

Text Entry

I feel walking down a stair case

A motor caught fire and nearby stored items caught fire and 2 persons felt breathlessness due to thick smokes

burnt

It was in office that the fire alarm went off due to voltage surge which resulted in chaos and disruptions

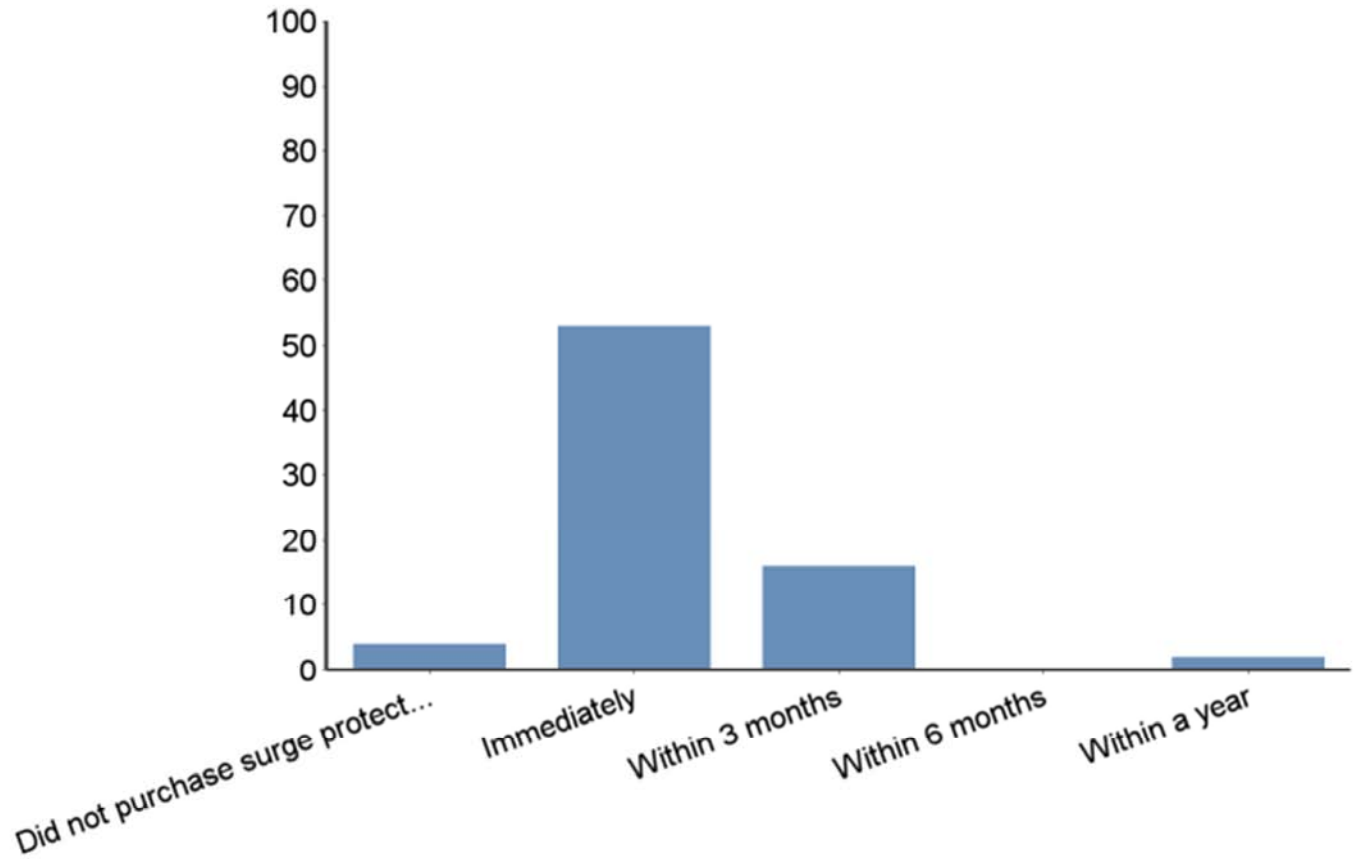
An electrical technician who reports to me was electrocuted by a small probe as a result of damaged insulation. Claims were filed.

Maintenance helper was was burned badly when a surge breaker kicked back on while doing repairs.

there were sparks and people were burned a little.

someone was hurt as a result of a voltage surge

Following one or more of the surge events that resulted in equipment damage at your current place of business, at what point did you purchase surge protection, if at all?



#	Answer	Bar	Response	%
1	Did not purchase surge protection		4	5.3%
2	Immediately		53	70.7%
3	Within 3 months		16	21.3%
4	Within 6 months		0	0.0%
5	Within a year		2	2.7%
	Total		75	100.0%

From the following list, please select the primary business function of the facilities you manage.

#	Answer	Bar	Response	%
1	Manufacturing		33	33.0%
2	Wholesale		3	3.0%
3	Retail		10	10.0%
4	Transportation/Warehousing		9	9.0%
5	Information (e.g. Publishing, Broadcasting, etc.)		4	4.0%
6	Finance/Insurance		2	2.0%
7	Professional and Business Services		15	15.0%
8	Education		2	2.0%
9	Hospital or AmbulatoryCare		1	1.0%
10	Healthcare Diagnostics		2	2.0%
11	Physician Office		1	1.0%
12	Federal Government		0	0.0%
13	State/Local Government		0	0.0%
14	Other (please describe)		18	18.0%
	Total		100	100.0%

In what region of the United States are you located?

#	Answer	Bar	Response	%
1	New England (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut)		7	7.0%
2	Middle Atlantic (New York, New Jersey, Pennsylvania)		16	16.0%
3	East North Central (Ohio, Indiana, Illinois, Michigan, Wisconsin)		14	14.0%
4	West North Central (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)		3	3.0%
5	South Atlantic (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida)		15	15.0%
6	East South Central (Kentucky, Tennessee, Alabama, Mississippi)		9	9.0%
7	West South Central (Arkansas, Louisiana, Oklahoma, Texas)		13	13.0%
8	Mountain (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada)		7	7.0%
9	Pacific (Washington, Oregon, California, Alaska, Hawaii)		16	16.0%
	Total		100	100.0%