

Incident Summary (II-637636-2018)

SUPPORTING INFORMATION	Incident Date		January 11, 2018	
	Location		Mission	
	Regulated industry sector		Low voltage electrical system (30V to 750V)	
	Impact	Injury	Qty injuries	1
			Injury description	One person reported minor smoke inhalation
			Injury rating	Minor
	Damage	Damage	Damage description	2 power bars, a timer, 3 plug in light fixtures, and the basement of a house were fire and smoke damaged.
			Damage rating	Major
	Incident rating		Major	
Incident overview		The occupant of a house awoke to a “pop” sound and the smell of smoke in the early hours of the morning. He made his way from the main floor of the house to a basement room that had electric lighting being used to grow plants. He found the area on fire, observed thick smoke, and attempted to put out the fire but was unable to. He and the other occupants of the house exited the building and called 911.		

INVESTIGATION CONCLUSIONS	Site, system and components	<p>A plug-in timer, power bars, and plug-in light fixtures where installed on a shelving unit to provide lighting for small plants. The equipment was set up and used over an extended period of time in the basement of a house being used to grow plants.</p> <p>Power bars as outlined in the “use and installation” section of the product certification standard are intended for use indoors (dry location) and to be directly connected to a permanently installed receptacle outlet.</p> <p>They are intended to supply power to cord connected utilization equipment.</p> <p>They are not intended to be used:</p> <ul style="list-style-type: none">- as a substitute for fixed wiring,- connected in series to other power bars, multi-receptacle devices, or extension cords,- in wet/humid operating environments,- in situations where they can be overloaded, or- in environments where chemicals may be used that can damage equipment. <p>When used improperly under these circumstances portable electrical devices and equipment can become damaged.</p> <p>Damaged or improperly used electrical equipment can pose electrical fire hazards.</p>
	Failure scenario(s)	<p>The basement of the house was being used as a growing facility.</p> <p>A room in the basement had wooden shelving that had three florescent light fixtures located above the shelves to provide growing light for small plants.</p>

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	<p>A 15A 120V timer was plugged into a 15A 120V duplex receptacle located on the wall. A 15A 120V power bar was plugged into the timer, and another 15A 120V power bar was plugged into the first power bar. Three florescent light fixtures were plugged into the power bars.</p> <p>Use of the power bar in this incorrect configuration over an extended period of time combined with use in an environment where it was repeatedly subject to water/moisture, plant resin/organic matter, and chemicals caused the power bar to fail.</p> <p>The occupant of the house heard a “pop” and smelled smoke.</p> <p>A fire originated at one of the power bars damaging the power bars, light fixtures and basement area.</p>
Facts and evidence	<p>Interview with occupant of the house that called 911:</p> <ul style="list-style-type: none"> - He awoke at 04:45 to a loud “Pop” sound and smelled smoke. - He went to the basement to check the source of the sound/smell and discovered the fire on the shelving unit. - He turned the main breaker off, tried to put the fire out, then got the other occupants out and called 911. - He was taken to hospital for smoke inhalation and later released. - An electrical contractor upgraded the service to the house from 100A to 200A in 2014 to facilitate the growing facility. - The equipment involved in the incident had been in use since the upgrade. <p>Interview with the fire department investigator:</p> <ul style="list-style-type: none"> - The house was being used as a growing facility. - The fire originated in a room in the basement being used to grow small plants. - Fire patterns indicated the area of origin appeared to be the bottom shelf of a wooden shelving unit used to support light fixtures and plants. - The point of origin appeared to be a power bar used to plug the lights into. - No other ignition sources were observed in the area of origin. <p>Interview with private investigators:</p> <ul style="list-style-type: none"> - Wooden shelving had growing lights and power bars located on them. - A power bar was plugged into a timer, had another power bar plugged into it (not approved for this use), and light fixtures were plugged into both power bars. - Fire patterns indicated the point of origin was a power bar located on the bottom shelf of a wooden shelving unit used for plugging in lighting fixtures to grow small plants. - The point of origin appeared to be the end of the power bar where the cord entered the device and where the switch was located. - No other ignition sources were observed in the area of origin. <p>On site observation of the timer and power bars:</p> <ul style="list-style-type: none"> - The first power bar was extensively fire damaged on the end where the cord entered the device, where the switch was located, and on the side of the power bar. - The power bar cord was destroyed by the fire and the conductors had evidence of electrical arcing. This indicated the power bar was energized at the time of the incident and also indicates an electrical fault may have

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	<p>occurred that produced arcing and thermal energy in close proximity to combustible material.</p> <ul style="list-style-type: none"> - The point of origin appeared to be on the power bar and/or flexible cord near the end where the cord entered the device and where the switch was located. - Multiple power bars were in use throughout the house and growing facility. Some being used as a substitute for permanent wiring for oscillating fans, ducted ventilation fans, and other equipment related to the growing of plants. - Most exemplar power bars showed signs of external discoloration from water/moisture, what appeared to be plant resin or organic matter, and likely chemicals from fertilizers or pesticides. - Information observed on the back of an exemplar power bar that was in use at the site indicated "DO NOT PLUG INTO ANOTHER RELOCATABLE POWER TAP – USE IN DRY LOCATIONS ONLY" - The area where the power bar was being used contained plants grown in trays/containers with dirt that required hand watering, suggesting that the power bar may have been exposed to water and operating in a location that was not dry. - The adjacent room/area contained a hydroponic growing system that contained water mixed with nutrients for growing as well as potted plants growing in dirt. <p>Review of the fire scene photos provided by the fire department and private investigators:</p> <ul style="list-style-type: none"> - Fire patterns in the room and on the wooden shelving indicated that the area of origin was the bottom shelf where the power bar was located. - Other investigators did not identify other ignition sources in the area of origin.
<p>Causes and contributing factors</p>	<p>The cause of the fire was likely due to the use of the power bar in an incorrect configuration and in a location subject to water/moisture, plant resin/organic material, and chemicals.</p> <p>The power bars were not approved to be plugged into other power bars or have other power bars plugged into them.</p> <p>The power bars were only approved for use in dry locations.</p> <p>It's probable that internal electrical components of the power bar corroded or faulted resulting in arcing or a high resistance connection and the release of thermal energy which ignited the fire.</p> <p>Using power bars in this type of environment over an extended period of time as a substitute for fixed wiring and receptacles likely contributed to the failure.</p>



Figure 1 - Photo provided by the fire department showing the room where the fire occurred. The red arrow shows the area of origin.



Figure 2 – Photo provided by the fire department. The red outline shows the power bar location on the plywood shelf viewed from the front of the shelf.



Figure 3 – Photo provided by the private fire investigator. The red outline shows the power bar location viewed from the back of the shelf (shelf pulled away from the wall). This is believed to be the area of origin.



Figure 4 – This photo shows the fire damaged power bar next to an exemplar power bar of the same type found on site.



Figure 5 – This photo shows the fire damaged power bar near the end where the flexible cord entered the device and where the switch is located.



Figure 6 – This photo shows the end of the power bar where the flexible cord enters the device and where the switch is located. It is believed that this area of the power bar is the point of origin based on the damage to the power bar in this location and the corresponding fire damage to the shelving structure. The red oval shows arcing/melting on the flexible cord conductor, indicating that this power bar was energized at the time of the incident.



Figure 7 – This photo shows an exemplar power bar used in the basement area. See red oval.



Figure 8 – This photo shows an exemplar power bar (red oval) used in another part of the basement area. Both figures 7 and 8 show that the power bars were similarly used throughout the basement. These configurations and use are similar to the configuration at the point of origin.



Figure 9 – This photo shows several more exemplar power bars used in the basement growing areas. Note the discolored plastic indicating the wet/humid environment, combined with what appeared to be plant resin or organic matter, and the use of chemical fertilizers and/or pesticides was not ideal for use of this type of equipment that is intended and approved only for use in a dry environment. These conditions will likely cause corrosion and damage to internal electrical components and contacts inside the power bar.



Figure 10 – This photo shows the warning on the back of the power bar indicating “DO NOT PLUG INTO ANOTHER RELOCATABLE POWER TAP. USE ONLY IN DRY LOCATIONS”.