WasteExpo

Events & Conferences: April 23-26, 2018
Exhibits: April 24-26, 2018
Las Vegas Convention Convention Center (Las Vegas, NV)
Fire Safety: The Threat Is Real

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In Collaboration with
Waste360™
wasteexpo.com
Fire Rover™ WasteExpo2018 Fire Protection Discussion

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Scope Of Waste & Recycling Facility Fires In The US & CAN
*368 unique incidents were reported; based on reasonable assumptions, we can extrapolate that 1700+ facility fires have occurred in the past 12 mo.

*5 Deaths
*7 Injuries
CFOA (Chief Fire Officers Asso) reported from the EA an average of 332 documented fires at waste fires btw 2001 and 2014. The CFOA also reported* 250 fires in 2015 at waste & recycling companies.

The equivalent number in the US would be well over 1700 fires annually based on an a reasonable extrapolation of population alone.

“Data was compiled from news articles we found by searching for the keywords “fire” + "transfer station"; "MRF"; "shredder"; and "recycling.”

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### The latest statistics, from the Environment Agency, show the incidence of Waste Fires from 2001 to 2013.

<table>
<thead>
<tr>
<th>Year</th>
<th>Regulated(^1) Sites</th>
<th>Unregulated(^2) Sites</th>
<th>Total fires</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>154</td>
<td>92</td>
<td>246</td>
</tr>
<tr>
<td>2002</td>
<td>203</td>
<td>140</td>
<td>343</td>
</tr>
<tr>
<td>2003</td>
<td>288</td>
<td>110</td>
<td>398</td>
</tr>
<tr>
<td>2004</td>
<td>254</td>
<td>83</td>
<td>337</td>
</tr>
<tr>
<td>2005</td>
<td>239</td>
<td>107</td>
<td>346</td>
</tr>
<tr>
<td>2006</td>
<td>284</td>
<td>95</td>
<td>379</td>
</tr>
<tr>
<td>2007</td>
<td>236</td>
<td>54</td>
<td>290</td>
</tr>
<tr>
<td>2008</td>
<td>227</td>
<td>48</td>
<td>275</td>
</tr>
<tr>
<td>2009</td>
<td>282</td>
<td>55</td>
<td>337</td>
</tr>
<tr>
<td>2010</td>
<td>286</td>
<td>59</td>
<td>345</td>
</tr>
<tr>
<td>2011</td>
<td>348</td>
<td>77</td>
<td>425</td>
</tr>
<tr>
<td>2012</td>
<td>247</td>
<td>55</td>
<td>302</td>
</tr>
<tr>
<td>2013</td>
<td>248</td>
<td>50</td>
<td>298</td>
</tr>
</tbody>
</table>

Data is for all categories of incident recorded:

1. Regulated – where a permitting regime specific to the source has been identified, e.g. waste operations and waste installations.
2. Unregulated – where no permitting regime specific to the source had been identified.
According to the California Product Stewardship Council (CPSC) in a survey released March 9 of 2018, 26 respondents from waste facilities across California, including northern and southern counties, as well as rural and urban:

65% of the reported fires were due to batteries.

35% of reported Fires were made up of combustibles (aerosols, butane cans), chemicals, hot ashes, and talking greetings cards.
40%+ of Waste & Recycling Facilities In The USA Have Experienced A Fire Incident During 2017!*

Assumptions:

• 7% of the fires are documented/reported
• EREF’s Municipal Solid Waste In The US published in 2016: 2013 there were 3,913 recycling facilities, 81 WtE, 1,540 Landfills and 3,494 Composting Facilities in the USA
• With Reasonable Assumptions: 5% of Composting Facilities In The USA have been subject to a reported or non-reported fire incident within the past 12 months
  • Includes Recycling & WtE Facilities
  • Does not include composting and landfills
Gut Check: Is This Number Real?

According to the California Product Stewardship Council (CPSC) in a survey released March 9th 2018, 26 respondents from waste facilities across California:

83% reported having a fire at their facility in the last two years!
*368 unique incidents were reported in the past based on reasonable assumptions, we can extrapolate that 1700+ facility fires have occurred in the past 12 mo. *5 Deaths *7 Injuries

Source: Ryan Fogelman, rfogelman@firerover.com

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What Is Causing The Increase In Fires?

1) **Heat / Dry Environments** – We have seen an increase in fires during the summer months, but when we see weather patterns that are dry and hot, we see spikes during other times of the year.

2) **China Recycling Restrictions** – Increased restrictions is causing our facilities to hold inventory that is open to fires.

3) **Lithium-ion Battery’s** – The issue is not only the shire number of these batteries being manufactured an incorrect placed in waste and recycling bins, but also the size makes them almost impossible to remove from the processing streams.

4) **General Awareness** – Increased awareness of the fire problem is causing more news coverage when events occur.

5) **Arson** – With fiber pricing at an all time low, some operators are desperate to hold on.
Is This Is Lithium-Ion Wave Finally Here?

We have experienced an 25% increase in reported fires from June 16 – May 17 to June 17-May 18

YTD 2018 we have experienced a 100% increase in reported fires YTD 2017

May 2018 facility fires were 124% higher than May 2017 and 46% higher than May 2016

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Fire, Thermography & Proactive Suppression Solutions
Safety
Goal: Solutions that do not require on-site potentially life threatening activities

Property Protection
Goal: Solutions that can proactively mitigate the source of the fire over traditional reactive fire protection technology

Protection of Operations
Goal: Proactive fire mitigation solutions that allow for continuity of business as well as ongoing fire watch

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Reality Of A Fire Incident

Traditional Chain Of Events

Cause ➔ Result

Traditional Fire Suppressants Systems ➔ On-site ➔ Fire Dept ➔ Clean Up

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“A Fire Incident Typically Doubles In Size & Cost Every 30 Seconds”

— Michael Hughes, Corp Dir Of Safety & Compliance Casella

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Reality Of A Fire Incident

Our Goal: Do Not Have A Major Fire Incident!
What Is The Fire Rover?

The Fire Rover is the only fire elimination solution that fights incipient fires & explosions combining: 1) Automated Thermal Detection; 2) Remote Human Verification, and; 3) Remotely Operated On-Site Suppressant/Elimination.
Our Goal: No Major Fire Incidents!

<table>
<thead>
<tr>
<th>Pre Incipient Stage</th>
<th>Incipient Stage</th>
<th>Smoldering Stage</th>
<th>Flame Stage</th>
<th>Fire Stage</th>
<th>Major Fire Incident</th>
</tr>
</thead>
</table>

The Fire Development Stages

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What Is The Fire Rover?

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What Is The Fire Rover?

- Self Contained
- 20m x 8m x 8m Shipping Container
- Fully insulated – (Heated & Cooled)
- 97% Water / 3% Foam
- Shoots for 6–12 minutes
- 110v Outlet Compatible
- 1000 Gallon Tank
- Nitrogen Powered
- Shoots 150psi

- Range up to 150m
- Removable
- Built in Fire Watch
- Typical “smoldering” event uses < 10% of the tank
- Can be placed in “remote” locations
- Lack of water source ok
- Lack of water pressure ok
- Can be removed and reinstalled

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What Is The Fire Rover?

FireAde®

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Pre-Incipient Stage Example:

The clock starts ticking BEFORE there is a flame!

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In Public/Private Partnership it is not always clear who the responsible party is for protecting the facility against fire, the owner or the servicer?

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We integrate as a partner with our Clients’ Team in their daily hazardous material operations.
The Lithium Ion Battery Problem

“...batteries can blow up or melt when internal electrical components short-circuit, when mechanical problems crop up, when they are subjected to an accident, or when they are installed incorrectly” (See: "Why some Lithium-Ion Batteries Explode").

“forecast demand for lithium--ion batteries is expected to increase up to seven–fold by 2024”

– Industrial Minerals

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Apple is going to add an estimated three billion mini lithium-ion batteries to the market alone with their new AirPod wireless headphones over the next ten years.

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Fire Rover Applications

- Waste & Recycling
- Industrial Equipment
- Metals
- Transfer Stations
- Tipping Floors
- Refining/Re-Refining
- Hazardous Material
- Rubber Feedstock
- Fleet
- Landfill
- Organics/Wood
- Paper/Cardboard
- MRFs
- Pre & Post Storage
- Industrial
- & More

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Fire Rover Applications

Tipping Floors

Fleet

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Fire Rover Applications

Specialized Hazards

Hazardous Material Operations

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Pre-emptive Maintenance For Industrial Equipment

Cost Effective Solution To Conveyor Sprinklers
Fire Rover Applications

Pre-emptive Equipment Optimization & Maintenance (Metering Drum)

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Fire Rover Large Thermal Applications

Outdoor/Landfill Applications
OSHA Standard Number: **1910.156**  Title: Fire brigades.

1910.156(a)(1) **Scope.** This section contains requirements for the organization, training, and personal protective equipment of fire brigades whenever they are established by an employer.

1910.156(c)(1) **The employer shall provide training and education for all fire brigade members commensurate with those duties and functions that fire brigade members are expected to perform.** Such training and education shall be provided to fire brigade members before they perform fire brigade emergency activities. Fire brigade leaders and training instructors shall be provided with training and education which is more comprehensive than that provided to the general membership of the fire brigade.

1910.156(c)(4) **The employer shall inform fire brigade members about special hazards such as storage and use of flammable liquids and gases, toxic chemicals, radioactive sources, and water reactive substances, to which they may be exposed during fire and other emergencies.** The fire brigade members shall also be advised of any changes that occur in relation to the special hazards. The employer shall develop and make **available for inspection by fire brigade members, written procedures** that describe the actions to be taken in situations involving the special hazards and shall include these in the training and education program.

1910.156(d) **Fire fighting equipment.** The employer shall maintain and inspect, at least annually, fire fighting equipment to assure the safe operational condition of the equipment. Portable fire extinguishers and respirators shall be inspected at least monthly. Fire fighting equipment that is in damaged or unserviceable condition shall be removed from service and replaced.
## Fire Brigade Tools

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Enforcer 3 Super Duty</th>
<th>Enforcer 3 Back Pack</th>
<th>Enforcer 10</th>
<th>Enforcer 30</th>
<th>Enforcer 60</th>
<th>Enforcer 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Throw Distance</td>
<td>45 Feet</td>
<td>45 Feet</td>
<td>45 Feet</td>
<td>75 Feet</td>
<td>95 Feet</td>
<td>120 Feet</td>
</tr>
<tr>
<td>Max. Discharge Duration</td>
<td>1 Minute</td>
<td>1 Minute</td>
<td>2.30 Minutes</td>
<td>3 Minutes</td>
<td>6 Minutes</td>
<td>20 Minutes</td>
</tr>
<tr>
<td>Discharge Hose</td>
<td>4 Ft. x 3/8&quot; Booster</td>
<td>4 Ft. x 3/8&quot; Booster</td>
<td>75 Ft. x 1/2&quot; Booster</td>
<td>50 Ft. x 3/4&quot; Booster</td>
<td>50 Ft. x 1&quot; Lay Flat</td>
<td>300' x 1&quot; Booster 50Ft. x 1.5&quot; Lay Flat</td>
</tr>
<tr>
<td>Height</td>
<td>22.5&quot;</td>
<td>22.5&quot;</td>
<td>22&quot;</td>
<td>38.5&quot;</td>
<td>38.5&quot;</td>
<td>45&quot;</td>
</tr>
<tr>
<td>Width</td>
<td>13&quot;</td>
<td>13&quot;</td>
<td>22&quot;</td>
<td>42&quot;</td>
<td>42&quot;</td>
<td>44&quot;</td>
</tr>
<tr>
<td>Length</td>
<td>8.25&quot;</td>
<td>8.25&quot;</td>
<td>26&quot;</td>
<td>54.5&quot;</td>
<td>54.5&quot;</td>
<td>98&quot;</td>
</tr>
<tr>
<td>Empty Weight</td>
<td>23 Lb</td>
<td>23 Lb</td>
<td>95 Lb</td>
<td>407 Lb</td>
<td>485 Lb</td>
<td>1200 Lb</td>
</tr>
<tr>
<td>Loaded Weight</td>
<td>48 Lb</td>
<td>48 Lb</td>
<td>175 Lb</td>
<td>677 Lb</td>
<td>985 Lb</td>
<td>2800 Lb</td>
</tr>
</tbody>
</table>

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Performance
Pressure Vessel Capacity: 10 U.S Gallons
Finished Foam Capacity: Up to 200 U.S. Gallons Finished Foam
Throw Distance: Up to 45 Feet
Discharge Duration: Up to 2 Minutes
Fire Brigade Tools

Performance
Pressure Vessel Capacity: 60 U.S Gallons
Finished Foam Capacity: Up to 1200 U.S. Gallons Finished Foam
Throw Distance: Up to 95 Feet
Discharge Duration: Up to 6 Minutes

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Fire Rover Solution Results

We Have Eliminated 78 Fire Incidents In Past 12mo!

How Do We Stop The Wave?

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Further Discussion

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Thank You

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*All responses will be kept confidential