Reducing belt entry fires in underground coal mines
Belt Entry Fires

Fire is reportable to MSHA if:

- Causes a death or severe injury
- 10 minutes or more to extinguish after discovery.

Fire must be reported within 15 minutes. The data in this presentation was based on the former 30 minute reporting standard.

30 CFR Part 50
2003 Belt Entry Fires

Reportable Fires 3
Non-reportable Fires 37

Source: MSHA Atmospheric Monitoring Survey, 2003
Number of Reportable Belt Fires by Year, 1980 - 2005
Number of Active Mines
Number of Belt Entry Fires
Rate, Belt Entry Fires per 1000 active mines

Year
Number of Active Underground Coal Mines
Number of Belt Fires and Rate per 1000 Mines

Updated
1980 to 2005 Belt Entry Fires
Reportable Fires Total = 63
There have been no fatalities
And no reportable lost time injuries

Source: MSHA Atmospheric Monitoring Survey, 2003
Belt Entry Fires

Historically have caused more damage than fatalities

Aracoma Alma Mine No. 1
Costs of a Belt Fire (non-injury)

Lost Production Days
Rehabilitation Costs
Mine Rescue Team Expenses
Extended Work Hours for Management
Increasing Trends

$45 to $90

Push for Production
Longwall belt downtime $30,000 per hour, 2002

Larger mines with Longer Beltlines

Fewer Belt Attendants

10 Drives and 5.6 miles of Belt
3 Attendants per production shift
Preventing Belt Fires
Early Detection of Belt Fires
Extinguishing Belt Fires
Preventing Belt Fires

Proper Maintenance and Examinations
56 percent

Portion of accident reports identifying inadequate maintenance as a contributing factor for reportable fires

Source: MSHA Accident Investigation Reports – Reported Fires 1980-2005
HOT ROLLERS, BEARINGS

10% Reportable
63 % Non-reportable
FRICTION ALONG BELT

18% Reportable

6% Non-reportable
FRICTION AT DRIVES
18 % Reportable
8 % Non-reportable
Welding and Cutting

10% Reportable
8 % Non-reportable
### REPORTED FIRE IGNITION SOURCES

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friction at Belt Drive</td>
<td>18 %</td>
</tr>
<tr>
<td>Friction Along Belt</td>
<td>18 %</td>
</tr>
<tr>
<td>Electrical, Diesel and Hydraulic</td>
<td>16 %</td>
</tr>
<tr>
<td>Cutting and Welding</td>
<td>8 %</td>
</tr>
<tr>
<td>Hot Rollers, Bearings</td>
<td>10 %</td>
</tr>
<tr>
<td>Indeterminable</td>
<td>30 %</td>
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</tbody>
</table>

Source: MSHA Accident Investigation Reports – Reported Fires 1980-2005
NON-REPORTABLE FIRE IGNITION SOURCES

Welding and Cutting  8 %
Hot Rollers and Bearings  63 %
Friction at Drive  8 %
Friction along Belt  6 %
Electrical, Hydraulic and Diesel  15 %

Source: MSHA Atmospheric Monitoring Survey, 2003
Detecting Belt Fires

Proper Installation, Maintenance and Operation
2002-2003

32 non-reportable fires of 37 were detected by using CO monitoring systems in an 18 month period

Source: MSHA Atmospheric Monitoring Survey, 2003
Extinguishing Belt Fires

......the last resort
CONCLUSIONS

Belt fires have increased in frequency and severity 2002-2006

Adequate maintenance can significantly prevent belt fires – factor in over half of fires

Early detection, fire suppression systems and fire fighting equipment provide a last line of defense against belt fires
Thank You