BELT EVALUATION
LABORATORY TEST
(BELT)

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OVERVIEW

- TIME LINE – 1989-2002 -- BELT TEST PROGRAM and RULEMAKING
- MID-SCALE TEST DEVELOPMENT
- VOLUNTARY BELT TEST PROGRAM
- RESULTS OF THE BELT TEST PROGRAM
- CONCURRENT-SUBSEQUENT RULEMAKING
BELT TEST PROGRAM
SUMMARY

- Large-scale fire tests made over a range of air flows
- Obtained & evaluated fire test data from large & small-scale tests
- BuMines developed a new mid-scale test for fire-resistant conveyor belts
Development of Mid-scale Test

- Scaling of the test
- Type, strength, location of the ignition source
- Size and location of the test sample
- Airflow conditions
- Material properties of the test apparatus
Mid-scale Fire Test

✓ Provide comparable results with large-scale tests
✓ Be easy to construct
✓ Be simple to operate
✓ Be repeatable
✓ Be cost effective
Time line--1989

- Public meeting at MSHA, A&CC, Jan. 19, 1989
- Discussed MSHA-BuMines large & small-scale belt flammability test work
- Presented MSHA’s future plans for conveyor belt testing (vol. prgm.) & rulemaking
MSHA 18.65 BELT FLAME TEST
BELT EVALUATION LAB TEST (BELT)
VOLUNTARY BELT TEST PROGRAM

• Instituted a test program at the MSHA A&CC—first test made on February 8, 1989
• Large variety of belt constructions from manufacturers were tested using the new belt evaluation laboratory test (aka BELT)
• No charge was made by A&CC for the tests
VOLUNTARY BELT TEST PROGRAM

• A large database was obtained on belt constructions that passed and failed the BELT
• The data was provided to each participating company and also incorporated into the rulemaking record
BELT Apparatus

- Test chamber is 6 feet long by 1-1/2 foot square with exhaust transition section
- Natural gas jet burner is used for the igniting source
- Steel rack used to hold the belt test sample in the tunnel
BELT Apparatus

- The belt test sample is 9 inches wide by 5 feet long
- Air flow through the tunnel is set at 200 ft./min.
- Natural gas jet burner for ignition is 5 minutes
BELT—Test Criteria

Criteria for pass/fail were developed for the BELT as follows—

✓ A belt passes if in 3 test trials there remains a portion of the 5 foot sample length that is undamaged across its width

✓ A belt fails the test if in any of the 3 test trials fire damage extends to the end of the 5 foot sample length
BELT Apparatus
BELT - Apparatus
BELT – Sample Holder
BELT-Test Sample
Ignition Burner Flame
Ignition of Conveyor Belt
Belt Ignited & Burning
Belt propagating flame
Remnants of Conveyor Belt
BELT – Burned Damage to Samples
**Summary**

**BELT-Flame Test Data**

- Started 2-8-89   Ended 5-26-94
- 21 belt companies & a chemical company participated
- Data obtained on over 700 individual flammability tests

<table>
<thead>
<tr>
<th>Class of Belt</th>
<th>Number that Passed</th>
</tr>
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<tbody>
<tr>
<td>Rubber &amp; Composites</td>
<td>95</td>
</tr>
<tr>
<td>PVC</td>
<td>38</td>
</tr>
<tr>
<td><strong>Total = 133</strong></td>
<td></td>
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</tbody>
</table>
Cloroprene BELT Data

Test Sample Number

Burned Length

1 2 3 4(20 mo.) 5(21 mo.) 6(34 mo.)

17 16 17.5 15 18 18

Test sample
BELT – 30 REPEAT TESTS

Composite belt (rubber/PVC)

Pass--Fail Line

Average

Burn Length, inch

Test Number
BELT Rulemaking

- Rulemaking was initiated concurrently with the voluntary belt test program in 1989
- MSHA proposed a rule for testing & approval of flame-resistant conveyor belts in the Federal Register, Dec. 24, 1992
- Comment period extended to March 26, 1993
Belt Test Rulemaking

- Record reopened March 31, 1995 and a public hearing held on May 2, 1995, on the conveyor belt test
Proposed Rule Withdrawal

- BELT in final rule stage as shown in Semi-annual Regulatory Agenda, May 13, 2002
- In Federal Register notice of July 15, 2002, MSHA withdrew the proposed rule for the new conveyor belt test (BELT)
- No further rulemaking activity with the BELT has taken place
Questions?