Innovations for Slope Development

Patton Mining, LLC
and
J. H. Fletcher & Co.
Abstract

• Patton Mining mechanized the sometimes hazardous, labor intensive process of driving a slope during the Deer Run project
• Utilized a J.H. Fletcher Co. Beam Setter with integral lifting and extending platform.
• Utilized preassembled steel sets from Keystone Mining Services, LLC
Mach/M-Class Mining

- Low/wide entries with belt parallel to travel way
  - Cross section 10’ tall x 27’ wide
- Mach Mining did not have Beam Setter or lifting platform
- M-Class had Beam Setter but no lifting platform
- All beams for both complexes were assembled in place with no preassembly
• Steel set assembled in place with no lifting platform
• No preassembled steel sets
Patton Mining, LLC
Deer Run Slope

• First new mine in the Springfield area in 30 years
• Longwall mine with two development sections
• 500’ depth of cover
• 9 degree slope, 3600’ long
• Narrower/taller cross section with conveyor over travel way
  – Cross section 16’ tall x 22’ wide
Due to 9 degree slope and general weakness of strata decision was made to develop slope as narrow as possible.
Slope cut with Joy 12CM27 continuous miner equipped with a bridge conveyor attached to a 42” development belt.
- Two Fletcher Single Boom Roof Drills (CHDR)
Equipment Placement
Cut Sequence
Problem

• Necessary to use tall square set beams that would be difficult to assemble underground.
• Lifting beams over and around 24” diameter vent tube and 42” wide conveyor.
• Safely installing steel plates and cementitious grout.
• Confined space.
J. H. Fletcher & Co. developed Timbering Machines as early as the 1950’s.
Solution

• Beam Setter with Platform at J.H. Fletcher & Co.
• Keystone Mining Services Preassembled Steel Square Set
• Preassembled steel square sets transported on section scoop from surface to working section
• Scoop modified with custom rack for easy handling
• Loaded on surface with fork lift
• Unloaded at working section with Beam Setter
• Beam Setter unloading steel square set
• Maneuvering steel set into position
Operator lifts beam over and around vent tube and 42” development belt.
• Steel sets are maneuvered into position and folded leg strap is cut

• Folded leg of steel set is then connected together at hinged joint and bottom channel
Lifting and extending platform positions workers so that sets can be connected together and steel sheets can be installed safely and ergonomically.
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<table>
<thead>
<tr>
<th>Month</th>
<th>Face Advance</th>
<th>Steel Sets Erected</th>
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<tbody>
<tr>
<td>April</td>
<td>347’ (106 M)</td>
<td>0</td>
</tr>
<tr>
<td>May</td>
<td>309’ (94 M)</td>
<td>124</td>
</tr>
<tr>
<td>June</td>
<td>10’ (3 M)</td>
<td>66</td>
</tr>
<tr>
<td>July</td>
<td>279’ (85 M)</td>
<td>73</td>
</tr>
<tr>
<td>August</td>
<td>486’ (148 M)</td>
<td>112</td>
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<tr>
<td>September</td>
<td>547’ (167 M)</td>
<td>168</td>
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<tr>
<td>October</td>
<td>377’ (115 M)</td>
<td>169</td>
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<tr>
<td>November</td>
<td>209’ (64 M)</td>
<td>81</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>2564’ (782 M)</strong></td>
<td><strong>793</strong></td>
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Results

• Slope was completed in 7 months
• Elimination of side galleries
• The J.H. Fletcher & Co. Beam Setter with platform eliminated heavy lifting and climbing
• The preassembled and hinged leg steel sets supplied by Keystone maximized the process of installing permanent roof support
• No lost time accidents