Directional Control in Longhole Drilling

Gas and Coal Outburst Committee
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Frank Hungerford
Ting Ren
Naj Aziz
INTRODUCTION

• Directional drilling allows boreholes to be accurately positioned to provide effective gas drainage
• Ability to steer boreholes allows alternate functions such as exploration and water management
• Early projects defined drilling and steering characteristics
• 1005m maximum depth
**Vertical Response**

- 74 mm Slimdrill DHM
- ¾ degree Bend
- 89 mm Bit

**Lateral Response**
Steering Guide
EQUIPMENT DEVELOPMENT

• Availability non-magnetic of high-torque, low speed Accu-drill DHM

• Increase bit diameter to provide a bigger diameter borehole to reduce friction – coincidentally standard HQ open-hole bit diameter of 96.1mm suited

• Increased bend to 1.25 degrees to provide off-set and steering ability

• Boreholes drilled to 1250 m and 1500 m
DHM Construction

DHM Bend Off-set
Vertical Response

- 73 mm Accu-dril DHM
- 1.25 degree Bend
- 96 mm Bit

Lateral Response
DGS Surveying Configuration – 3m lead
Survey positions relative to drill bit
Borehole and Seam profile
Lateral Deviation
Vertical Response
Lateral Response
Max Feed Pressure 16.8 MPa

Feed Pressure

816D40 - Borehole Depth (m)
Planned Borehole with Roof Intersections
Borehole and Seam Profile
Plan
- Exploration Borehole
- Previous Borehole
- Defined Structures
Feed Pressure vs Borehole Depth

Max Feed Pressure 16.8 MPa
Feed Pressure vs Borehole Depth
Lateral Deviation vs Azimuth

Target Azimuth 244 deg
Target Offset (L/R) -215m

Curve Right @ 1.5 deg/6m from 117m Left
Entry Heading 190 deg

Lateral Deviation (m)
Azimuth (degrees)
FUTURE RESEARCH / DEVELOPMENT

• Introduce 6 m survey ‘lead’ to VLI drilling operations
• Improve data collection in areas of feed pressure, rates
• Produce Response Curves from each drilling project for each DHM/Bend/Bit configuration
• Assess accumulated friction effects from various steering practices
• Assess friction effects from overall curve rates and initial off-set angle of standpipe from Target Azimuth
• Define optimum borehole design and steering practices for consistent longhole depths
• Define optimum DHM configuration for individual project requirements
CONCLUSION

• Understand in-hole friction effects
• Provide optimum drilling practices
• Provide optimum equipment design / configuration
• Enhance driller knowledge and skills
• Improve ability of recovering gear bogged in longholes