

The Use of Trench Sampling in Open Pit

Coal Mines for Cost Effective Data Capture

Trench sampling in Rotowaro open pit mine 2023-2024

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Agenda

- Introduction
- Utility & Limitation
- Trench to model cycle
- Rotowaro site trenching
- Renown
- Taupiri Upper
- Taupiri Main
- Summary



Introduction- Rotowaro open cast mine

- Rotowaro open cast mine, Huntly, New Zealand
- Historically worked mine providing thermal coal
- Trench sampling can be an effective method to collect data
- Frequent trenching opportunities at Rotowaro
- Opportunistic approach with cost effective pay-off





Trenching Utility



Time Effective:

- Collection time
- Short logging times
- Easy to mobilise plant and people required



Data collection:

- Coal quality
- Seam thickness and continuity
- Geological mapping



Cost effective:

- Lesser costs associated with plant and labour required
- Contractors often not required



Trenching Limitations



Accessibility:

- Limited depth of investigation
- Reliant on seams outcropping in walls or faces



Sample representativeness:

- Limited data on overlying strata
- Limited data on overlying structures



Health and safety:

- Safety risks
- Hazard management often required



Introduction- Trench sampling for coal

3. Modelling:

- Input data
- Update grids
- Data validation

1. Site selection

 Identify mode discrepancy

2. Sampling

- Dig trench
- Log face and identify plys
- Collect coal samples and send for
- testing







1. Site selection: S14- Renown

- Trenches (RT001- RT007) occur along previously cut face at regular intervals.
- Extensive ability to trench along this face reduced the drill holes initially needed and made one planed drill hole redundant







Sampling: S14 - Renown

- Seven trenches in total
- Dug using excavator and by hand
 - Trenching part of drill program
- Trenching used to limit drill holes required





3. Modelling: S14 Renown







3. Modelling: S14 Renown

BLOCK : RESO_STAT_CAL





1. Site selection: Taupiri Upper

- Discrepancy noticed between seam observations in field and Grid surfaces
- Red line is inferred TP roof and brown transparent surface was the TP roof grid
- This was due to a wrongly correlated drill hole with the carbonaceous mud layer above the TP seam was called TP





2. Sampling: Taupiri Upper

- Seam exposed in highwall fresh coal exposed with shovel.
- Holes dug into seam to provide stable footing to collect samples up near top of the seam
- Very top to seam was too high to safely access so just lower split sampled
- Majority of total TP seam at trenching site was made up of the TP2 lower split

SAMPLEID	HOLEID	PROJECTCOD	SAMPFROM	SAMPTO	SAMPLETYF	PRIORITY	Sampler	am_Lev Samp_Comment		Interim
QP_RT009_001	RT009	ROTOWARO	0.22	0.58	Ply	1	WS	0 CO-[MD - And - MD]- py: no py. Coal Roof- Blocky	coal ~6% ash. Sharp contact above.	Υ
								CO-[D - To - D]- py: no py. Band of slightly higher	ash coal. Duller coal above and below. ~ 8-	
QP_RT009_002	RT009	ROTOWARO	0.58	0.89	Ply	1	WS	0 12% ash. Crumbly with platty fracture		Y
QP_RT009_003	RT009	Rotowaro	0.89	1.56	Ply	1	WS	1 CO-[MD - To - MBri]- py: no py. relativly hard coal	. Bloacky Fracture. ~6% ash	Y
								CO-[MD - To - MBri]- py: no py. Relativly Hard Coa	l with blocky fracture. Slightl;y less	
QP_RT009_004	RT009	Rotowaro	1.56	1.88	Ply	1	WS	1 consolidated than above. ~6% ash.		Y
QP_RT009_005	RT009	Rotowaro	1.88	2.34	Ply	1	WS	0 CO-[MD - To - MBri]- py: no py. Solid consolidated	l coal. ~6%ash	Y
QP_RT009_006	RT009	Rotowaro	2.34	2.57	Ply	1	WS	0 CO-[MD - To - MBri]- py: no py. coal above floor. s	harp lower contact. 6-8% ash.	Y



- A trench Sample was taken of the TP seam
- Trench used in modelling and drill hole re-corelated to bring grid down to satisfactory position





• The difference between the old grid and seam Roof contact increases with cutback





• Amended grid more accurately represents the surface











1. Site selection: Taupiri Main

- Targeting the TM seam at the base of the western high wall
- Aiming to help increase the model confidence and collect seam quality data





2. Sampling: Taupiri Main







3. Modelling: Taupiri Main







Summary

- Trenching has been used at Rotowaro to improve our understanding of coal seam orientation, depth and quality.
- Improvement in cut-back viability assessment, grid and block model seam alignment, and model confidence.
- With an opportunistic approach trenching can be a time- and cost- effective way to supplement data collection.

