

# Equipment Operations Technology – 407

## Group project

Fall 2005

Replacement project

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### ABET Description

This project is designed to help consolidate the issues involved in designing materials handling systems. The ABET distribution is:

a	b	c	d	e	f	g
			1			

Identified changes:

- Suggestions welcome
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Here are the details for the simplified project, replacing the RT project that we were going to be doing.

Mine description:

- Block cave
- Single lift, at 1000 meters of depth
- Crushing station required underground
- Elliptical orebody with radii of 600 x 200 meters
- No significant water entry
- Ore size in draw-point P80 at 25cm, largest chunks 1.5m
- Medium RMR, limiting span openings within ore body to 4 meters, 6 meters within waste zones
- Paving underground haulage levels possible
- The mine plans to run two shifts of 10 hours each.
- Both electric and diesel LHDs can be used.

Production rate: 55,000 tonnes (metric) per day

Due to caving and ground movement, the shaft must be placed 800 meters from the ore body. The production/haulage drifts are 60 meters apart centerline-to-centerline.

Design a materials handling system to achieve the production rate. List all assumptions. Be realistic (i.e. no 100% availability). The following flow-sheet can be assumed::

1. Mucking into ore passes
2. Ore passes combine into crusher station(s)
3. Conveyed from crusher station(s) into an underground storage bin and loading pocket from which it should be loaded into a skip, to be conveyed to surface. The storage bin should have a half-day's production capacity.

The final product should list the specifics of the equipment and processes. The report should be professional and include plans, flowsheets, an executive summary, and be properly sectioned with page numbers and a table of contents.

Approximate costs:

LHD (<http://www.tamrock.sandvik.com/>)

Electric LHD – \$1.5 Million cap, \$50/hr operating

Diesel LHD – 1.2 Million cap, \$55/hr operating

Ore pass - \$600/ vertical meter

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Crusher station: \$3.5 million

Drifting costs:

A = cross sectional area (in meters)

Cost per meter of final paved drift =  $A35 + 900$

Shaft costs

D = diameter of shaft (in meters)

Cost per vertical meter of shaft development =  $D450 + 1350$

Conveyor costs

W = width of belt (in meters)

Cost per meter of conveyor =  $533W + 300$