Red Dog zinc mine adds US$6.5 million annually through blast monitoring

CASE STUDY

Commodity	Grades	Geology	Powder Factor	Location
Zinc	Low, medium, high	Shale-hosted	1.6 kg/m^3	North America

Red Dog operation, located in the Arctic Circle in northwest Alaska, is one of the largest zinc producers in the world. It also produces lead and silver.

- Shale-hosted zinc, lead, and silver deposits are mined in two pits with four blasts per week
- Drills and blasts 25 ft. (7.6 m) benches that are mined in a single pass
- High grade ore/waste or ore/ore boundaries are visually controlled

Challenges

Ore loss, dilution and misclassification due to difficulty in visually identifying ore boundaries

- Difficulty in visually identifying low and medium grade ores bounded by Baritic material
- Misclassification of low and medium grade ores (i.e. medium grade ore is stockpiled as low grade or low grade ore is sent to the mill)
- Visually identifying high grade ore boundaries did not fully account for blast movement, resulting in significant ore loss

Solution

BMM System accurately monitors blast movement of ore boundaries and translates ore polygons

- Blast movement monitors (BMMs) are installed in monitoring holes throughout the shot
- Installation and detection as per site standard operating procedures
- BMM Explorer software calculates new dig lines along ore boundaries, and areas of ore loss and misclassification that would have occurred without monitoring

Results

Reduced ore loss, dilution and misclassification saves Red Dog zinc mine US$6.5 million per year

Teck's results show that Red Dog Operations saves an estimated US$6.5 million[1] annually through blast movement monitoring.

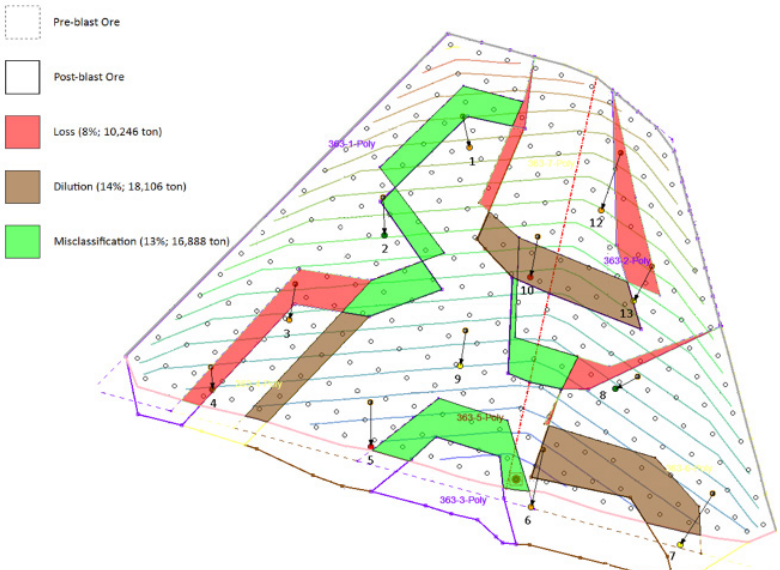
The movement that occurs at Red Dog is demonstrated in this example blast. Movement variation of ±50% from the mean horizontal is common, and occurred in this blast.

- Measured horizontal movement ranged from 12.8 – 34.5 ft. (4 – 10.3 m) and vertical movement up to 17 ft. (5 m)[2]

As a result of accounting for actual blast movement, and not relying on visual controls, Red Dog mine:

- Prevented 18,106 Tons of waste being sent to the mill (14% dilution)
- Avoided ore type misclassification of 16,888 Tons
- Recovered an additional 10,246 Tons of ore

> "The information we get from the blast movement sensors allows us to track the movement of ore in greater detail than ever before, leading to improved productivity and sustainability at our operation."
>
> Brian Hall, Mine Geologist, Red Dog Operations



In this example blast, accounting for blast movement recovered 10,246 Tons of ore, and avoided 18,106 Tons of dilution.

1. Source: www.teck.com/news/stories/2018/tracking-the-blast
2. Measured by BMT BMM System

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07/2018