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## Draglines and their limitations in the Zaamar Goldfield of Mongolia

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### ABSTRACT

***"A Dragline is not so cheap, for its overburden mounds are supposed to be later lowered and smoothed, more than doubling the costs due to double handling."***



#### **AT THE END OF A DREDGE POND...**

A Dragline above a pond it has stripped for the North Dredge of Shijir Alt. The high water level prevents any further stripping.



#### **SWIVELING FAST...**

Draglines of this type can turn very fast even with a full bucket of material.

Draglines are profitable and popular in Mongolia as the preferred means of cheap large-scale removal of overburden from gold placers. In the Zaamar Goldfield they are used to prepare the dredge paths of 4 large Bucket-Line Dredges, 2 owned by Shijir Alt Ltd, 1 by Altan Dornod Mongol Ltd and 1 dredge being assembled by Monpolymet Ltd. Nearby, Draglines strip the overburden in the Hailaast Valley as part of large-scale dry mining by Hailaast JSC of the alluvial Hailaast Placer. Intermittently, Shijir Alt Ltd redeploys its Draglines from dredge-support duties to strip overburden for occasional dry mining of the alluvial Tuul Placer (Quaternary) and the clayey red Ulaan Placer (Neogene). Elsewhere, Draglines were formerly used in the Bugant Goldfield in pre-stripping overburden in advance of Bucket-Line Dredges, and are currently used in the Shariin Gol Goldfield for stripping overburden in dry placer mining.

The popularity of the Draglines is in their speed, ruggedness, long reach, low operating cost, straightforward soviet technology, affordable spare parts, proven track record, and elimination of numerous trucks, excavators or bulldozers. A typical example is an Esh 70/11 model with a bucket capacity of 11m<sup>3</sup>, a boom length of 70m and a stripping rate of 400m<sup>3</sup> per hour, power rated at 550kW from the national electrical grid. The cost new is around \$2m.

The Draglines usually stop mining in mid December due to intense cold and resume mining in mid April. Operating 20 hours per day for 30 days per month, an Esh 70/11 Dragline is capable of stripping up to 240,000m<sup>3</sup> a month, giving an annual output of 1,920,000m<sup>3</sup> for the 'Dragline season'. That is impressive, and costs (capital + operating) should be



### **DRAGLINE TURNING ON ITS 'PERCH'...**

One of the Draglines stripping overburden ahead of the South Dredge of Shijiir Alt Ltd. The Dragline has cleared around itself and is now on a 'perch'.



### **GREY SPOIL, RED CLAY...**

Dragline of the North Dredge of Shijiir Alt, hidden behind a mound of stripped overburden and red Ulaan Placer.



### **DRAGLINE ON THE TOSON ALLUVIALS..**

Monpolymet's Dragline preparing the dredge pond for the start-up of dredging of the Tuul Placer beneath the Toson Alluvials.

Draglines are not the only option for large-scale overburden stripping. Instead, some deep dry open-pit placer mines in the Zaamar Goldfield have large excavators loading a fleet of 'merry go round' dumper trucks taking overburden to large spoil mounds later smoothed by large bulldozers to produce acceptable landforms. For instance: Altan Dornod Mongol Ltd's new mine in the Ulaan Placer; Bayangol JSC's new mine in a splay of the Tuul Placer under the West Terrace; and Erel Ltd's former mine in the Erdes Terrace Placers.

For this type of operation, operating and capital costs are generally higher than for draglines. However, some of the deep dry pits are now so deep that normal Draglines could not be used, and often the desired trucking distance greatly exceeds the reach of the Draglines.

Other alternatives to Draglines have not been introduced at Zaamar. The alternative of long conveyor systems would be much cheaper, more flexible and more reliable than truck fleets. The alternative of Cutter-Suction Dredges is attractive and is presented elsewhere in this volume ([CLICK TO VIEW](#)).

well below 20 cents per m<sup>3</sup>.

However, the Draglines have major shortcomings that are now becoming critical:

**Firstly**, the Draglines are not designed to excavate under water and this means that the overburden below the water-table is a considerable problem. The Draglines are not able to strip below the level of the Tuul River, but it is beneath the floodplain where the much of the huge Tuul Placer occurs. The remedy resorted to is to strip the overburden down to the river level and then for a Bucket-Line Dredge to dredge out not only the Tuul Placer but also the wet portion of the overburden. The penalty for this is that as the Bucket-Line Dredges have integral On-Board Wash Plants, all material has to be dredged, including every m<sup>3</sup> of dredged overburden. This is a mild irritant when the top of the Tuul Placer is shallow, but in some areas the top is many metres below the water table and then the annual gold output will fall sharply if a Bucket-Line Dredge is dredging and washing overburden for much of its operating hours.

**Secondly**, a Dragline is not so cheap for its overburden mounds are supposed to be later lowered and smoothed, more than doubling the costs due to 'double handling'. A major concern to environmentalists, regulators and the local community is the reluctance of mine owners to undertake this expensive work promptly, if ever. In the semi-arid sharply continental climate of Zaamar, the steep-faced conical and linear dragline mounds are too dry and steep to vegetate and a visual barrier of trees is not possible.

**Thirdly**, the Draglines often strip along with the overburden rich pockets of pay-gravel, and in some areas draglines have stripped away an entire upper pay zone to lay bare the target lower pay zone, according to research by Eco-Minex International. This makes good economic sense for the Dragline user, but can leave behind dragline mounds that are capable of being profitably re-mined in some instances.

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