



Technical Article

An Investigation into the Performance Failure of Conveyor Belt Ploughs

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This article deals with and investigates the performance failure of a common conveyor belt plough. The type of plough referred to is widely used in the bulk materials handling industry, especially in the fields of coal and mineral ore mining. The investigation also uncovers and analyzes the plough's failure to clean a conveyor belt return strand of incidental material fines and proposes means to overcome and rectify this shortcoming in a practical and economic way.

A conveyor belt plough arrangement as shown in Fig. 1, is extensively used in materials handling industries. It protects conveyor belts against damage caused by spillage material. Material, falling on to the empty return belt, is removed by its vee-shape, before it can get caught between pulley and belt.

To be effective, it is installed either near the conveyor tail end to protect its pulley or it is situated ahead of the automatic belt tensioning arrangement, where it prevents spillage from falling on to the take-up pulley.

When a device of this kind is considered adequate for its purpose, the simplicity of its design and the economic appeal of both manufacture and installation, make it a favourable competitor against other similar devices.

Failure to perform as expected during operation is likely to be attributed to faulty installation or negligent maintenance. The nature of its failure to perform adequately can be detected by the fact that material finds its way past the plough's scraping blade. Under certain conditions, this material adheres to the pulley face and builds-up on it to such proportions that it will ultimately damage the belt.

In order to perform satisfactorily, the scraping blade of the plough must be in continuous contact with the belt across its full width; the contact pressure being as uniform as practical. It can be proven that this condition cannot be achieved under operating conditions with an arrangement as shown in Fig. 1. The aim of the following investigation is to find its shortcomings. Simple modifications will be suggested, resulting in the improvement of the plough's efficiency, without having to employ a more complex belt cleaning system.