

# **SYSTEM FOR DETECTING AND REPORTING THE LOSS OF AN ADAPTER FROM THE DIPPERS OF MINING EXTRACTION MACHINERY**

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## **ABSTRACT**

A successfully case of a smart integration of laser technology and image processing is a new invention for automatic detection of missing teeth from dippers in mineral extraction shovels<sup>1,2</sup>. The dippers of the excavation machinery, as well as shovels used for mineral extraction and other heavy works, are provided generally with teeth to fracture and to tear apart the rocks in the ore or waste material at the pite site. On many occasions the teeth and/or adapters, or parts of them, break and fall mixing up with the ore or waste material that is being extracted, which can produce serious damages and/or stop the operation of the primary crushing system that process the ore, if they are not detected and discarded before they come to it. For that reason a new system that allows to detect and report to the shovel operator a loss of an adapter, tooth or any part of them, from the dippers of the extraction machinery, has been developed by HighService's innovation specialists team.

The system is composed of a heavy duty camera with an optical filter, a laser pattern generator with wavelength compatible with the before-mentioned optical filter, an anti-vibration suspension system where the camera lens is mounted with both the filter and the laser pattern generator. The position of the dipper is well-known through a signal generated in the shovel which is sent to the processing system in order to generate the Laser pattern precisely synchronized when the adapters and the teeth are visible in a given operational position.