



**MSHA's Accident Prevention Program
Innovative Products**
**"A Missing Tooth Detection System
for Mining Shovels and Loaders"**

**Safety
and
Health
are
Values!**

When a broken tooth from a mining shovel or loader gets caught in the mine's crushing or processing equipment, there is a potential for the tooth to be shot from the equipment at very high speeds potentially creating a lethal situation. There are also many inherent dangers involved with manually removing a tooth that has become stuck in a crusher. To avoid these situations, a system has been developed to immediately detect a broken bucket/dipper tooth and warn the operator of the incident.

The system employs a camera system to constantly monitor the bucket or dipper during each digging cycle. When a lost tooth is detected, the system immediately alerts the operator with an audible alarm as well as a warning light on the LCD screen indicating which tooth is broken. The operator is also able to visually monitor the bucket on the LCD screen to assist with bucket fill-factor, truck positioning, and collision avoidance, as well as observing the bucket for any other damage such as broken lip shrouds. The system employs the latest machine-vision and image-processing techniques to decide if all of the teeth are present based on the images obtained from a rugged, high-resolution camera mounted on the boom.



If you are a manufacturer or know of any manufacturers of similar products, please contact MSHA's Applied Engineering Division at 304-547-0400 at 304-547-0400 or e-mail InnovativeProducts@dol.gov.

Issued:	06/24/2005
Tag #	AP2005-T90625

Remember "SAFETY and HEALTH are a VALUE" you can live with.