

Image Captions and Descriptions for the ***5DT Long Wall Training Simulator***

Short form descriptions of the above simulator are supplied below. Image captions and image descriptions are also supplied.

Long Wall Training Simulator

This system teaches the trainee operator how to control a Long Wall (LW) in such a way as to increase productivity and maintain a high safety standard.

The trainee controls the LW in a virtual coal mine with controls that closely resemble those of a real LW. The trainee wears a head mounted display (HMD) that is fitted with a head tracker. A real Shearer Remote Control Device is interfaced to the simulator computer.

The system may be used for the training of new operators or for evaluation of experienced operators. The training is performed in a safe and controlled environment.

MINE_Ugnd_LW_001

Configuration Screen

The *virtual* Long Wall may be configured to mimic a specific *real* Long Wall. The instructor may configure the position of the main gate and the tail gate. Attachments to the auxiliary (secondary) booms may also be configured, e.g. attaching a lump breaker or a water boom (boom fitted with water sprayers). The instructor may also configure the rotation (clockwise or counter-clockwise) of the left- and right drum.

MINE_Ugnd_LW_002

Controls

Before a trainee can control the virtual Long Wall, he/she needs to master the different controls. The Shearer Information Screen is situated at the bottom-left. This screen provides feedback as to the status of the shearer. The shearer is started with the Shearer Control Panel (bottom-center). This virtual panel is operated via mouse-clicks. Once the shearer has been started, it may be controlled with the Shearer Remote Control (top-right). The Shearer Remote Control may be operated via mouse-clicks as well. A real Shearer Remote Control, interfaced to the simulator computer, is normally used. Once a trainee has mastered the controls (pre-simulation mode) he/she may graduate to the main simulator.

MINE_Ugnd_LW_003

Simulator Setup

The trainee views the virtual Long Wall and its surroundings with a Head Mounted Display (HMD). The HMD is fitted with a Head Tracker. The Head Tracker tracks the orientation of the trainee's head and relays this information to the host simulation computer. This computer then calculates the image that the trainee would see in the virtual Long Wall, and the image is rendered to the HMD. The trainee controls the virtual Long Wall with a real Shearer Remote Control that is interfaced with the host simulation computer.

MINE_Ugnd_LW_004

Trainee View

The trainee views the virtual Long Wall and its surroundings with a Head Mounted Display (HMD). The trainee may 'walk' under the roof supports by means of a special simulation joystick. The Hydraulic cylinders are shown on the left. The shearer is shown to the right. In the distance the floor pans curve ('snake') to the right.

MINE_Ugnd_LW_005

Fire Suppression System

This image shows the fire suppression system at work. Water spray is directed backwards. The left cutter drum is shown in the foreground (left). The cutter drum cowl has been released and it hangs

down. The lump breaker can be seen just below the center of the screen, below the boom of the left cutter drum. The lump breaker breaks large lumps of coal on the conveyor belt (track).

MINE_Ugnd_LW_006

Water Sprayers

This image shows an outside view of the Long Wall. The instructor may navigate a virtual camera to any specific viewpoint. Such viewpoints are normally used to point out specific characteristics to the trainee. The water sprayers have been switched on for dust suppression.

MINE_Ugnd_LW_007

Positioning the Ranging Arms

The ranging arms have been positioned for cutting. The leading drum has been raised to the roof and the trailing drum has been lowered to the ground. Note the cowl of the trailing drum being dragged along on ground level.

MINE_Ugnd_LW_008

Roof Supports and Snaking Floor Pans

This image shows the Long Wall in its totality, with roof supports and the floor pans curving ('snaking') on the ground. The Shearer is shown in the distance (left-top).

MINE_Ugnd_LW_009

Advancing Roof Supports

The roof supports systematically advance once the shearer has passed. The shearer is moving from right to left in this image. Roof support movement may be accelerated for demonstration and instruction purposes.

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