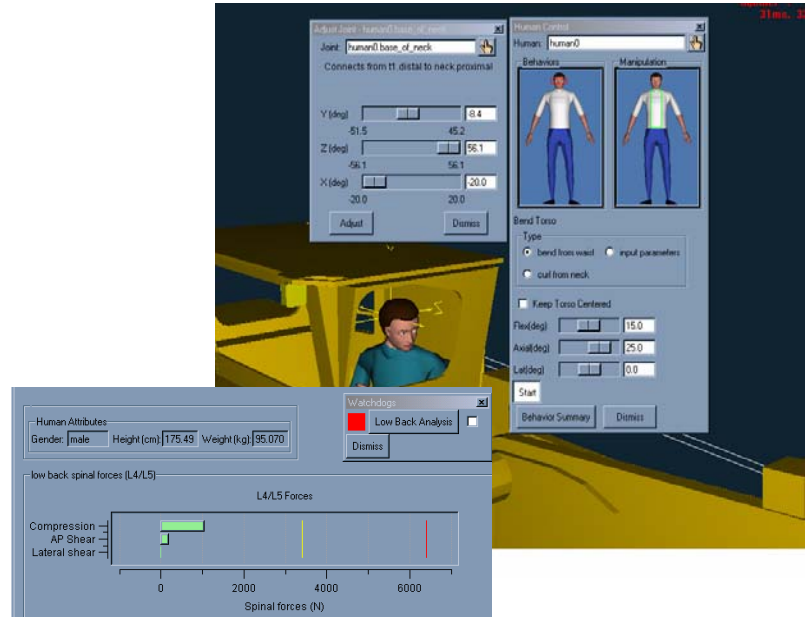


Visibility Project Fact Sheet

LHD Operator Posture Assessment

OBJECTIVE:
To determine the postural deviations and low back load required for line of sight from the operator's position.



Background

The bi-directional nature of load haul dump, LHD, vehicle design dictates that operators sit in a centrally located seated position, perpendicular to the direction of travel. The typical driving posture used by LHD operators involves twisting of the neck and trunk to sight down the mine tunnel. These twisting postures are sustained for long periods of operation. In order to obtain a line-of-sight or view machine boundaries, operators also flex their trunk forward, backward and to the side. Twisting and bending of the trunk and neck combined with long periods of sitting while exposed to whole-body vibration are known risk factors for low back disorders.

A computer simulation program, JACK, was used by the research team to evaluate postural load associated with the posture deviations common during LHD operation.

Methodology

JACK provides a comprehensive analysis of low-back compression, anterior-posterior shear and lateral shear. Using visual attention locators, VALs, as necessary sites to view while operating, a human model is moved through a series of increasingly non-neutral postures until the VAL site is visible. The associated loads on the spine are documented.

Using this strategy the research team can evaluate posture loads under different driving scenarios and for different operating cab configurations (i.e. seat/console rotations). Results allow the research team to identify the cab configuration and operator posture which yields the lowest postural load score and the highest visibility score.

Applications

Within Industry: Increased awareness of risky postures and feedback on posture strategies to improve sightlines and minimize spinal loading.

Within Manufacturing and Design: Provide ideal specifications for seat and console rotation intervention.

Within research: Results can be applied to other underground machinery. This work illustrates the feasibility of using virtual reality in injury prevention and design.

For more information

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