

The animation of the sand and gravel simulation model shows statistical data at any point in time as they are updated continuously by the program (O'Connell & Sturgul, 2010). The animation of the simulation program displays the following statistics:

- loads of mined materials and tonnages at each loader.
- the current time, hour, day and week of the mine by a programmed clock.
- utilization of loaders (%).
- the number and amount of dumped materials into the process and storage area.

To implement a conveyor belt in the sand and gravel mine operation, a mobile crusher is required. The mobile crusher can be seen on the animation. A mobile crusher is positioned at the mine face where an excavator feeds right into the crusher. The mobile crusher has a built in transport mechanism that allows it to move with the excavator (Frizzell & Martin, 1992).

### **CONCLUSION**

The goal of this mine project was to design a discrete-event system simulation program to test and investigate a wide range of feasible material handling system options in an aggregate mine operation. The simulation program is flexible, and therefore can be modified to study the effects of different conveyor belt types and/or the various haul truck models used in the mine. SME Annual Meeting Feb. 23 - 26, 2014, Salt Lake City, UT 3 Copyright © 2014 by SME.

The simulation and animation model was run for several scenarios. After analyzing the mine operation, the life of the mine, economic analysis, and the conveyor belt advantages, such as cost-effective operation, low noise pollution, dust emissions, operating and capital costs and the mine simulation results, recommendations were made to the engineers. Simulation results indicated the combination of a conveyor belt working with a truck haulage system would

be a beneficial decision for this mine and its operation characteristics.

This simulation model can be used to run for more additional "what-if?" scenarios to analyze further material handling selections for the mine operation.

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