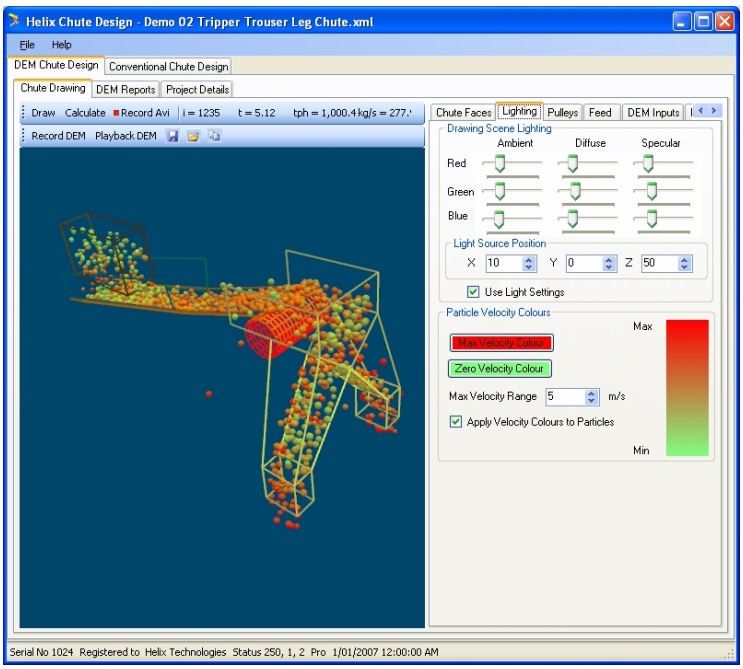
New DEM Conveyor Transfer Chute Design software

Helix Technologies, a leading developer of belt conveyor design software based in Perth, Australia, recently released a new Conveyor Transfer Chute design program. The program uses the Discrete Element Method, called DEM, to calculate and simulate the path a bulk material follows through a transfer chute.



The DEM method is gaining international acceptance as a realistic way to predict the flow of a bulk material, and coupled with the increase in computing power delivered by standard desktop PC's, this method is now at the forefront of technology. DEM particle flow technologies are the subject of research at many institutions including the CSIRO in Australia and Universities around the world.

Traditionally, transfer chutes were designed by relying on experience because analytical calculations can only be applied to the first part of the chute such as the parabolic discharge trajectory. What happens to the material flow after it leaves the pulley and impacts a chute wall is not easy to determine and engineers have had to rely on past experience and trial and error. In some cases, scale models of the transfer are built and tested before a final design can be adopted and this physical modeling is time consuming and expensive.

Helix Technologies identified a need for a practical, easy to use program that can allow engineers to design transfer chutes quickly and easily using their standard computer. This meant that the software must be capable of running as a stand-alone program without the need for special 3rd party software or special supercomputers.

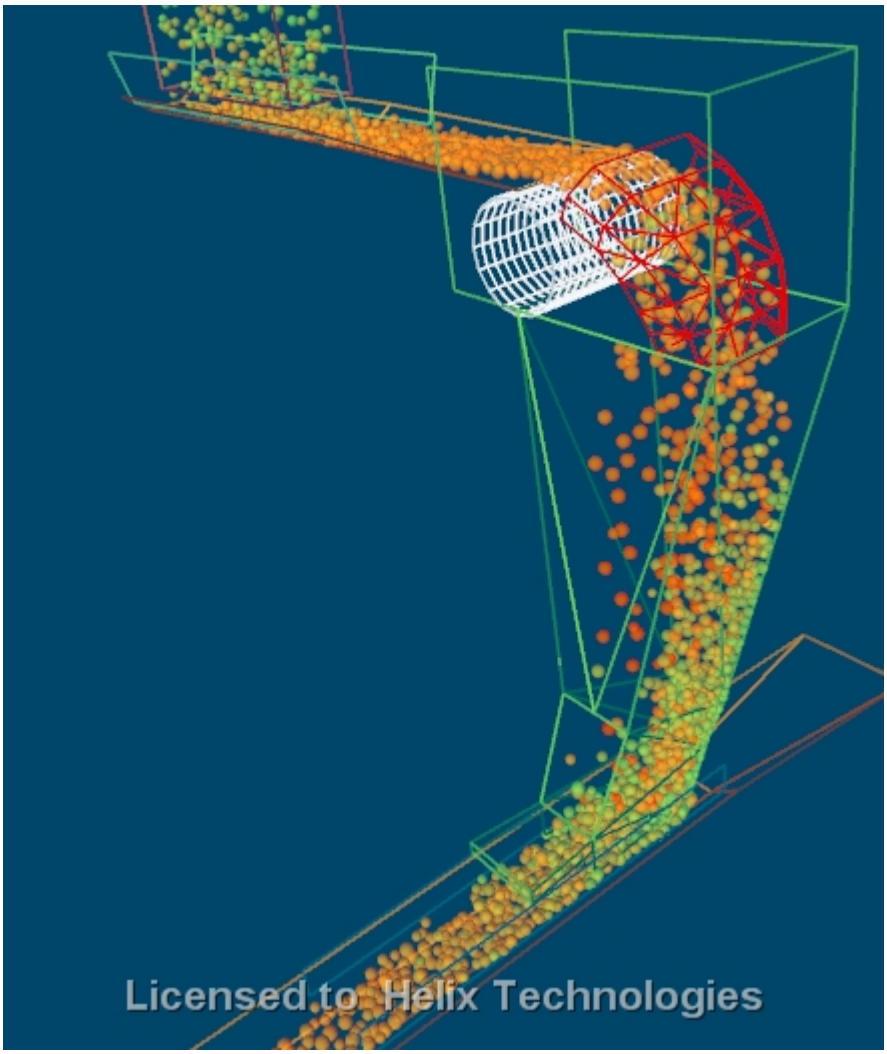
Helix Technologies proceeded to couple their in-house technical programming capabilities and experience with the latest Visual Studio C# .Net Microsoft Windows® development tools to produce a stand-alone program which allows the user to draw the transfer chute, perform the very intensive DEM calculations, view the results in real time as the calculations proceed and even make a Windows Media Player .avi movie all within the Helix program. This complete solution in one package is unique, but the program also allows integration with other design tools such as CAD drafting programs, although these are optional.

The program uses OpenGL graphics coupled to DEM calculations and 3D Vector geometry developed entirely in-house to provide the materials handling design engineer with a complete design tool for transfer chutes. The engineer can draw the chute in the program and then watch the flow paths as the material flows through the chute. Adjustments to the chute geometry can made in the Helix DEM program and

the new flow paths observed, allowing for optimization of the design in a very quick time. The Helix DEM method tracks the path of each individual particle as it collides with other particles, chute impact plates and liner faces and moving conveyor belts and pulleys.

The program has been verified by site observations on actual transfer chutes in both the Coal and Iron ore industries in Australia at very large port and ship loading operations. The Helix DEM program predicts the actual flow paths observed on-site and has even been used to simulate chute blockages observed in practice.

Helix Technologies' research and development of conveyor design software began in 1992. The company's software is used by thousands of engineers in more than 25 countries around the world and this new Helix DEM Chute Design Program is the culmination of intensive software development by the company. DEM Movie simulations of typical conveyor transfer chutes can be seen at www.helixtech.com.au and a demonstration trial program is also available from the Helix website.



Helix DEM Transfer Chute Design program screenshot.