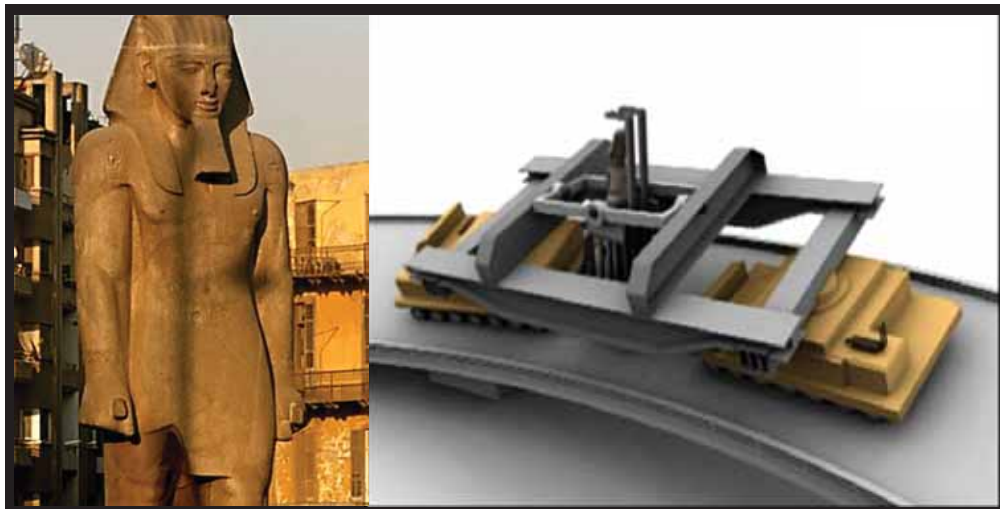


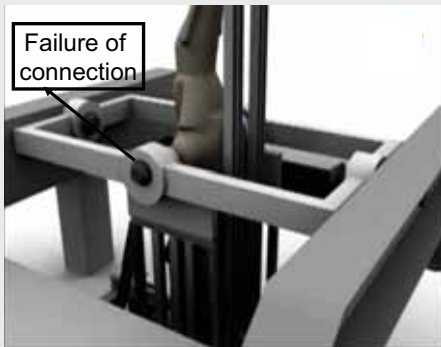
The 3000-year-old statue of Ramses II was discovered in 1820. In 1955, the statue was assembled and erected at the Ramses Square in downtown Cairo. The statue was erected on a 3-meter pedestal at the edge of a fountain. Over time the structural stability of the statue deteriorated due to exposure to pollution, and vibration from traffic and subways. The Egyptian government therefore decided to relocate the statue to a safer and more dignified location. The eventual resting place of the statue will be the Grand Egyptian Museum (GEM) where the statue will greet visitors at the entrance to the GEM that is scheduled to open in 2010.

The transport of the statue from Ramses Square to Giza was a technological challenge. The 11-m high red granite statue weighs about 83 tons. The statue needs to be transported in one piece without causing any further damage to the priceless statue. In early 2006, the Egyptian Ministry of Tourism announced an international tender for the project of transporting the statue. The bid was awarded to the Arab Contractors Company. An accurate 3D dynamic structural analysis for the statue was required.

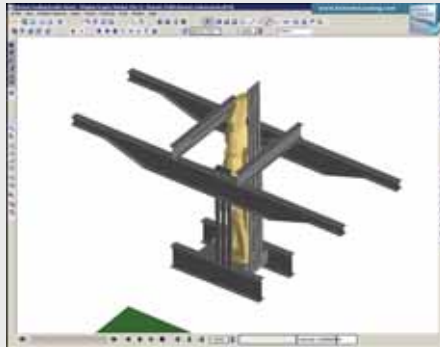


The Arab Contractors tasked ASI to make the analysis required to approve the proposed mode of transportation. ASI created a 3D model of the statue using its patented technology Extreme loading for Structures (ELS). ASI studied several scenarios for moving the statue taking into consideration preexisting cracks and evaluating the stresses in the statue and the probability of failure for each scenario.

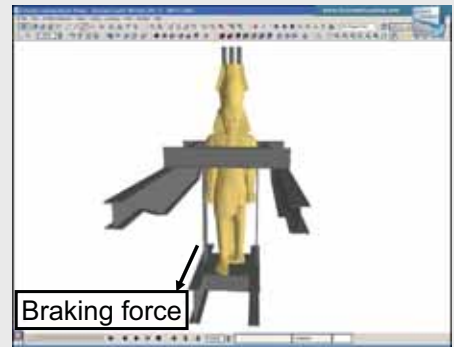
After detailed studies, Arab Contractors settled on a specific scenario which involved moving the statue in the upright position. For the chosen scenario, ASI performed a detailed vulnerability assessment and studied several secondary scenarios which involved the impact of failures in any of the connections of the confinement frame used to transport the statue. The possibility of any tilting of the vertical axis of the statue was also taken into consideration. The analysis showed that the stresses were within the allowable limit. The move took place on August 25, 2006. During its ten-hour transport the statue was wrapped in rubber foam and transported on two flat-back trucks. The move was successful and as predicted by the ASI analysis the statue sustained no damage.



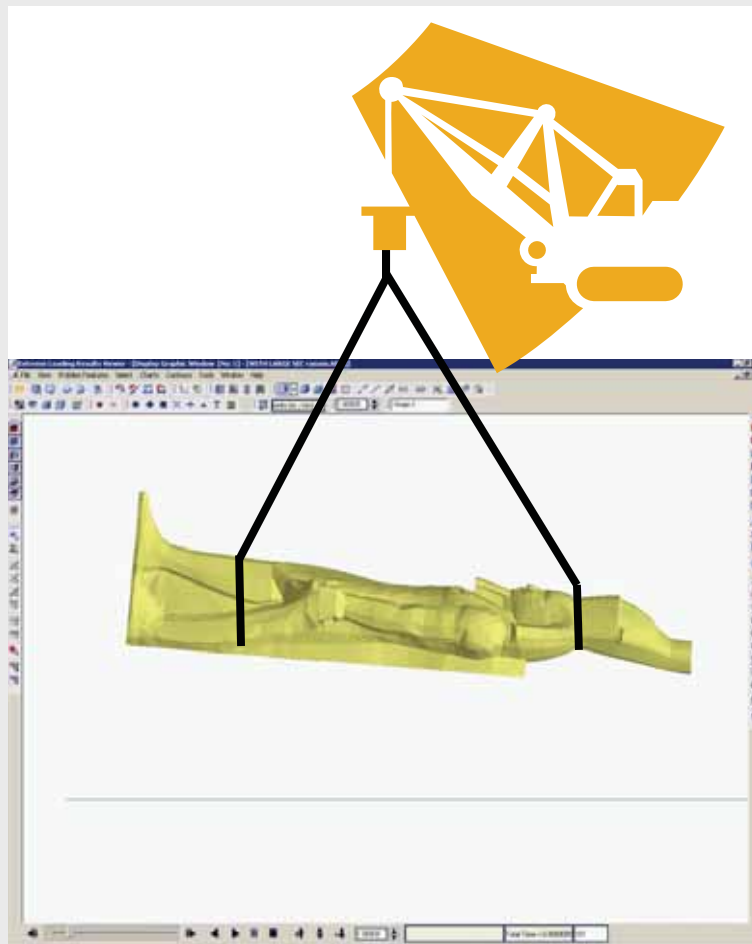
Model of connection failure



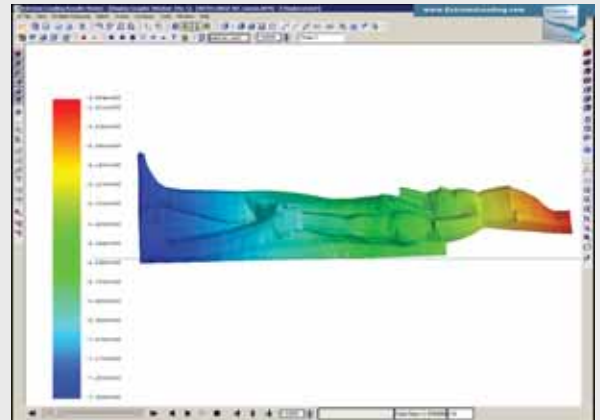
Deformation due to connection failure



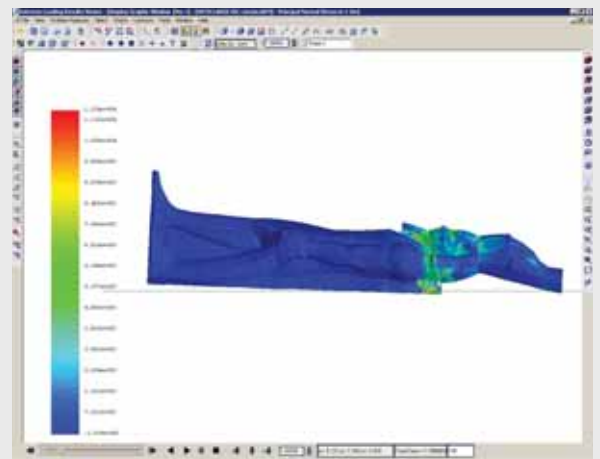
Displacement due to braking



Drop of the statue (Crane rope failure)



Displacement in Z direction



Stress Analysis for Different Alternatives

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