

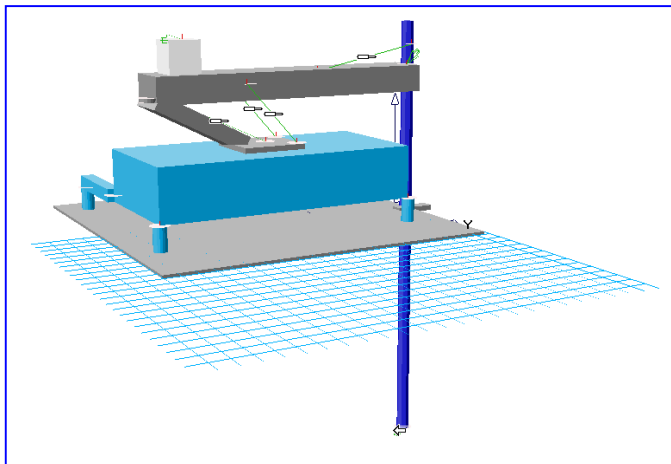
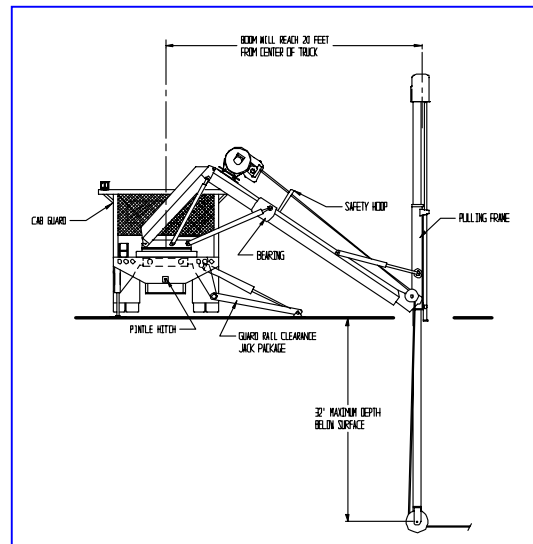
## Product Development System Succeeds Again!

OK Champion wanted a new cable puller design for the ICUEE show at the end of September 1999

and it was already the end of June. **Could a brand new product be designed and ready to present in only 12 weeks?** To meet the challenge of such a fast track design, OK Champion submitted the project to the engineers of Alpine Engineering & Design, Inc. Using a design strategy we have developed over the last 25 years, we outlined the project and sent OK Champion a detailed quotation. They liked what they saw and sent us a purchase order to start the design on July 7, 1999.



After doing some brainstorming, we came up with a concept drawing. By July 26 we had a layout that met the OK Champion specifications for the range of motion. As the layout progressed, we did hand calculated stress analysis on the design to give us the comfort level that the design was close and could be done. We continually reviewed the project with the customer to keep them in the loop. The motion of this product was very complex. It could move in and out, up and down, yaw side to side, and rotate 180° about the truck. The wheel at the bottom of the boom could rotate 360°; the boom itself could slide 16 feet down into a manhole.



The motion was so complex that we modeled it with Working Model™ Motion. This helped us identify the forces throughout the structure for a number of worst-case load situations. This 3D analysis allowed us to obtain accurate information about the forces applied to all of the critical areas of the new design. By doing this, we found a couple of problems that did not show up in the hand calculations and we revised the design to solve those problems.

