The Department of Agricultural and Biological Engineering at the Pennsylvania State University selected four senior-year engineering students to design and manufacture a large-animal rescue system. Sponsored by Davis Hill, (senior extension associate for the department) the team of students chose a bipod gantry solution to the problem. This solution had been in place previously to train local firefighters and rescue personnel. However, the system failed during routine testing. Therefore, the focus of this project was to correct the aspects that caused failure for the previous prototype.

Certain design criteria was set for the gantry. The following list describes each specification as requested by the sponsor:

- **Portable**
  - The gantry should be created in sections so that the entire system can be transported to the rescue site by hand.
- **Easy to use**
  - The sections of the gantry should assemble/disassemble easily because time is an important factor in animal rescue.
- **Lightweight**
  - Each section should weigh less than 60 lbs so that it could reasonably be carried and set up by one or two people.
- **Strong**
  - The gantry should be strong enough to withstand 20,000 lbs of force from an excited animal.
- **Inexpensive**
  - The gantry should cost less than existing commercial gantries (<$3000).

To remedy the problems faced by the previous prototype, the team devised several modifications. The first change involved material selection. The gantry is supported by legs consisting of three sections each. Using computer simulations, the team tested the sections using many different types of steel and other metals. 4130 alloy steel, otherwise known as chrome moly, was selected due to its high strength to weight ratio. This material was utilized for the top and middle sections of the support legs while leaving the bottom section as the original plain carbon steel.

Another modification included increasing the distance that the sections overlap one another. Increasing this allows the total force on the system to be distributed over a larger area which decreases the total stress on the system. The overlapping distance has been increased from 6 inches on the original gantry to 18 on the new prototype. These two modifications led to a successful initial test of a lightweight gantry costing < $900.