

# *Assisted Flatbed Gooseneck Trailer*

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**We acknowledge the cooperative support of CornPro Trailers.**



## **Objective:**

### **-Modified trailer**

Modify the dovetail region on a CornPro 10K heavy duty 25' flatbed gooseneck trailer. This modified design is efficient, safe, productive, relatively simple, easy to manufacture, and very marketable. This design will hopefully broaden CornPro's already extensive consumer base.

### **-Final written and oral report**

The final written report will culminate all that was completed, researched, and designed throughout this modification process. The report will allow the reader to understand why we chose this particular project along with how it was executed. The results, methods, and recommendations will also be presented in this final written and oral report.



### Adjustable dovetail: current design

- CornPro offers a two position dovetail on their trailer line.
- A single 10,000lb jack adjusts the dovetail position.
- Adjustment made to the dovetail by manual jack system is relatively time consuming.



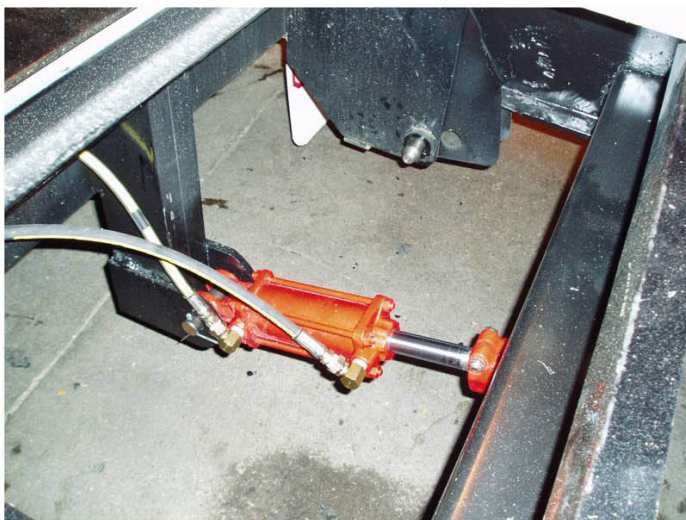
### Current pin design

- Pins placed on either side of the trailer hold the dovetail in place.
- Openings on each side provide placement for pins when dovetail is in the raised or lowered position.
- When weight from the dovetail is exerted upon the pins they can become tight within their openings.
- Adjustment pins are held in place by safety pins which must be removed and installed before each adjustment.

### Analysis of current design

- Before our team was able to design a new system, we first studied the force required to move the dovetail.
- Our team used a 5,000lb digital scale to obtain weights at different points in the dovetail.
- We first calculated the moment or force of the dovetail at a given point in order to solve for the force on the hydraulic cylinder.





## Redesigned lift system

- A double acting cylinder is sized at 2.5" bore with a 4" stroke. This cylinder is capable of lifting 12,270 lb. After calculations, the cylinder requirement was 8,211 lb which gave our team a 4,059 lb safety factor at the cylinder.

## Spring release pin system

- The new pin system that was designed during this project was designed with efficiency and ease of operation in mind for potential consumers.
- The new pin system is relatively simple and practical, consisting of 20"x0.75" rod of cold rolled steel, a 9"x1.25" pin, (2) 8"x.75" compression springs, 11.25"x0.75"x0.75" square steel for handles, 16.5"x2" steel tubing with a 7" long milled slot, a 1.5"x.375" bolt, and a 2" washer to contain the springs and rod.



## Pump/motor assembly

- The pump/motor is located next to battery within a secured storage box under the cross-members on the trailer.
- This pump/motor assembly is a 12V solenoid-operated with a load holding capability and variable pressure settings.
- This unit has an 8 quart hydraulic oil reservoir with a relieve valve setting of 2,500 PSI. A remote control is also attached to the assembly that makes operation safe and very efficient.

