



One Person Lifter and Loader

Sponsored by Prototools Corporation

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Project Overview

The purpose of this project was to design a lifter operated by a single person that will function in trucks/vans, can automatically lift a load vertically and stow it away in a secure and timely fashion.

Project Requirements

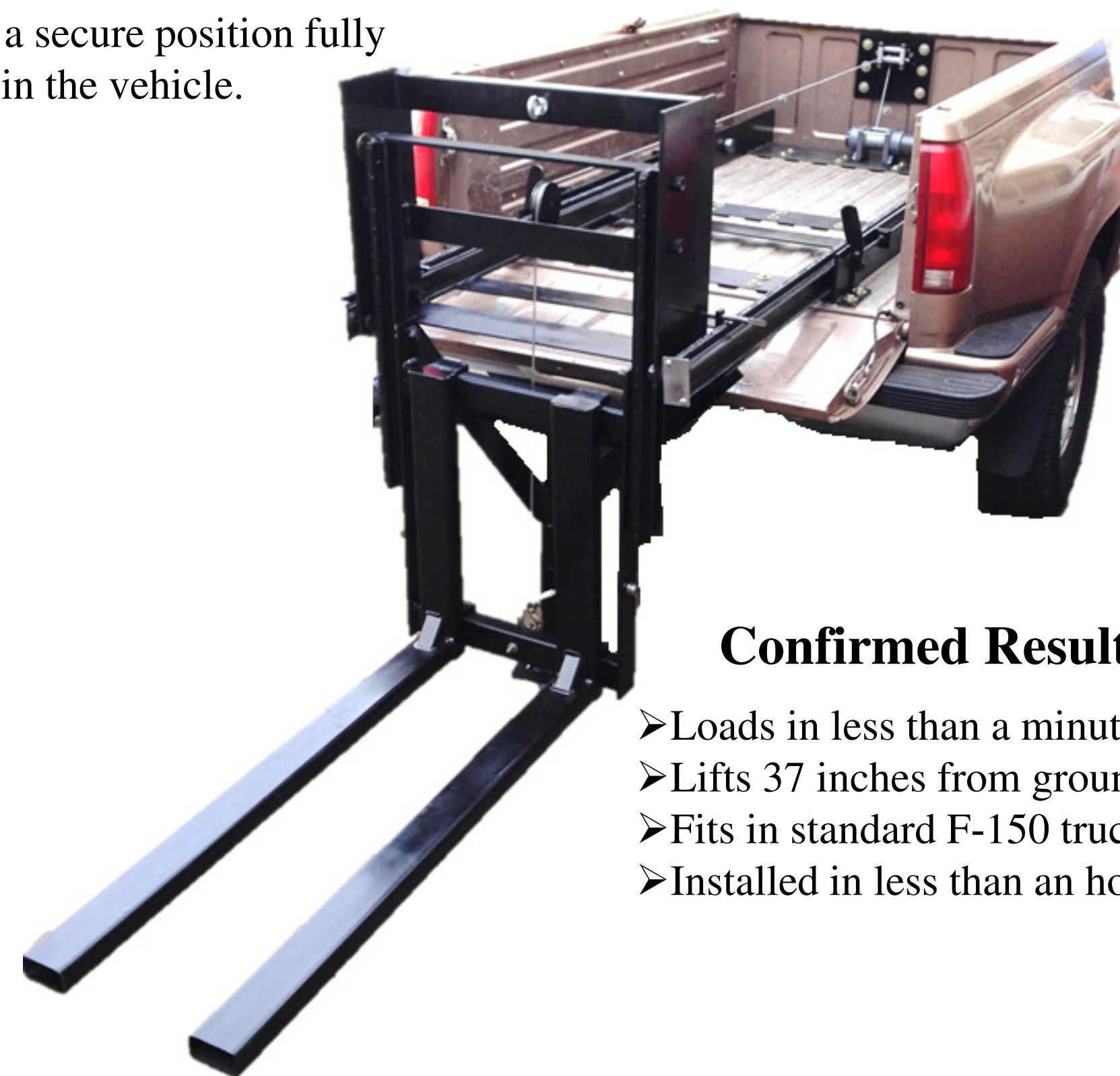
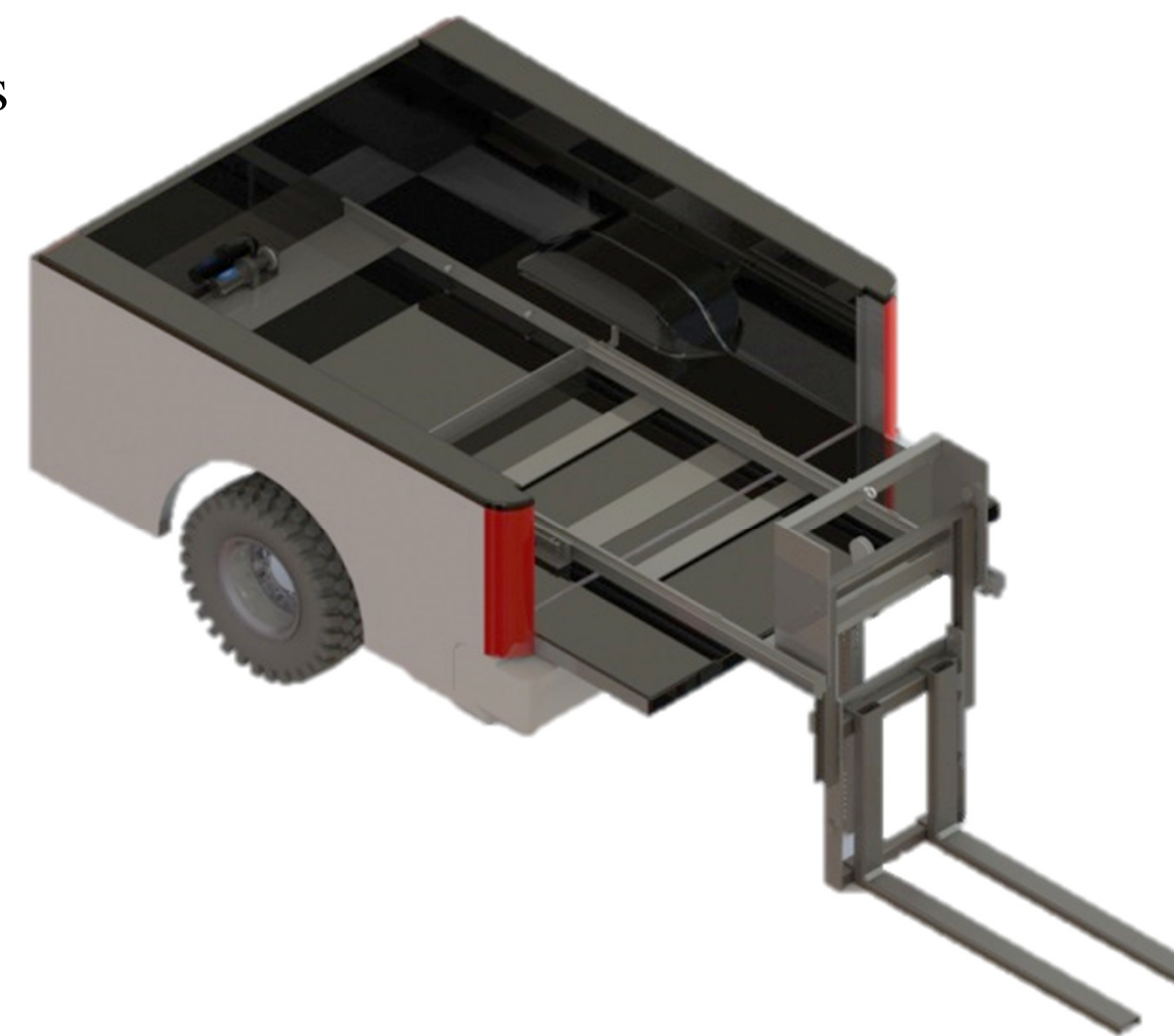
- Lift 1000 lbs
- Lift the load parallel to ground
- Fit inside 78"x42"x38"
- Weigh less than 450 lbs
- Each part weigh less than 100 lbs
- Lift the load in less than 40 seconds
- Installed in less than 90 minutes

Project Justification

There are a wide range of lifting and loading applications that are not served by current commercial products. Included in those applications is the ability to lift and load long and narrow objects without the use of an external loading device such as a forklift. The need is particularly evident at truck destinations, such as job sites, where lifting equipment may be unavailable.

How It Works

- Lifts a load on the forks and rolls up the vertical sliders until the vertical carriage reaches the horizontal carriage.
- The horizontal carriage and the vertical assembly travel horizontally along the horizontal sliders until the load is half way stowed in the vehicle.
- After the horizontal slider is half way in the vehicle's cargo space, the support beam will be removed and the load is free to slide to a secure position fully stowed in the vehicle.



Confirmed Results

- Loads in less than a minute
- Lifts 37 inches from ground
- Fits in standard F-150 truck bed
- Installed in less than an hour

Viper Max MX2500 Winch

- The 2500 lb winch brings in and lets out the 3/16" steel cable that provides the main lifting power.
- The winch is powered by a standard car battery.
- By pressing a rocker handlebar switch, the winch pulls the load in both the vertical and horizontal directions.



Horizontal and Vertical Sliders

- Welded A36 steel telescoping pieces are utilized for the vertical and horizontal motion of the machine.
- Tabs are welded to the vertical slider and carriage at specific positions to keep the slider from rolling out and to ensure correct movement when telescoping.



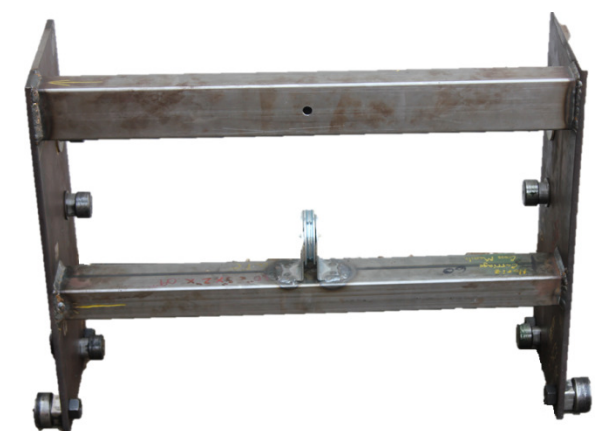
Cam Followers

- CF20 rollers move along the horizontal slider while the CF18 rollers move along the vertical slider.



Carriage

- The carriage acts as the transitional part that holds the pulley as well as ties the horizontal motion to the vertical motion



Forks

- The 4"x2"x3/16" hollow rectangular tubes act as forks and are welded to the 4"x2"x1/4" vertical hollow rectangular tubes.
- A thick gusset is necessary and aids in the large amount of stress when the forks are supporting the 1000 lb load.