Side Loading Kayak System

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Introduction

- **Loading a typical kayak, which can weigh up to 100 lbs, by yourself is a hassle that some people cannot physically do**
- **Though it is inconvenient and difficult for younger, able-bodied individuals, it is still possible for them**
- **There are segments of the market who cannot physically load kayaks onto the top of a vehicle by themselves**
- **Goal: Design and fabricate a loading system that would assist kayakers with the loading and unloading of their kayaks**

Current Market Solutions

Telos: Cost is about $450. The side arms must be collected and placed in the trunk of the car by user.

Thule: Costs around $800 which is far too expensive compared to other items in the same market.

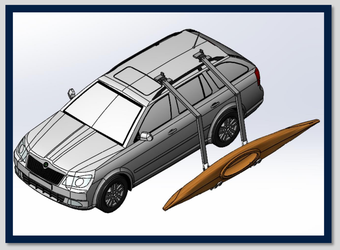
- **Current market solutions are cumbersome and expensive**
- **It was also concluded that a rear loading system is inefficient due to the length of the kayak at the back of the vehicle**

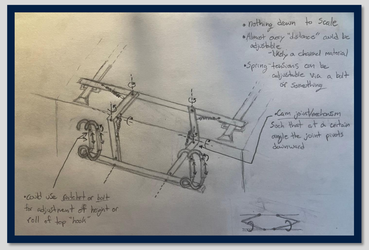
Design Criteria

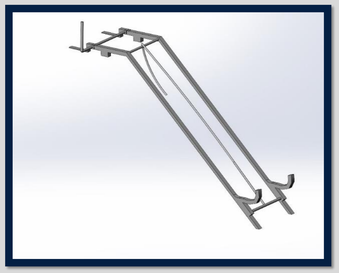
- **Utilize side loading geometry**
- **Make the system easy to use and can reduce lift weight**
- **Have a way for easy loading and unloading**
- **Make the system universal to vehicles and kayak support systems such as current kayak mounting brackets**
- **Keep the theoretical direct to consumer cost close to about $200 which is cheaper than the current market solutions**

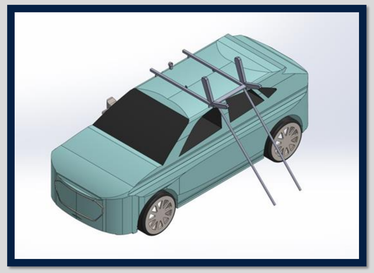
Preliminary Designs

- **Each member of the team produced an initial design using the design criteria**
- **The designs were reviewed for pros and cons of each one**









Final Design

- **Mounts to cross bars on top of vehicle**
- **Arm that extends over kayak**
- **Block and tackle pulley system to lessen lifting force**
- **Roller system to run kayak onto rack**
- **Two separate parts to increase user movability**

Prototype

Takeaways from prototype testing:

- **Needed to add more height from roof**
- **Larger displacement at free end**
- **This was a rapid prototype so imperfect results were expected**
- **Learned that the final product must be very rigid around the mounting point to ensure no flexing from arm moment occurs**

Latest Product

- **Made from steel beams**
- **Increased height from roof**
- **Corner bar to help rigidity and stabilization**

Further Discussion

- **In final production the system would be made from aluminum rather than steel to decrease weight**
- **The design would be optimized to increase manufacturability**
  - **These include: adjusting dimensions for universal use and optimizing dimensions for strength requirements**