SCISSOR LIFT SAFETY EXTENSION

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POD DESIGN SKANSKA

INTRODUCTION

Problem

Scissor lifts provide an effective method for construction workers to access elevated locations, but their size and shape prevent workers from accessing constrained work positions without resorting to unsafe practices like standing on guardrails.

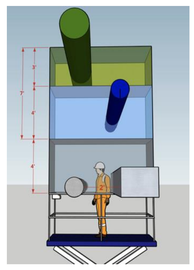
Task

Create a scissor lift attachment that will safely and easily provide construction workers access to narrow areas.

Motivation

Current solutions fail to provide the necessary additional elevation, only work with certain models of scissor lifts, and are difficult to use.

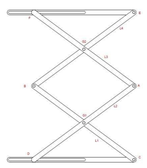
Scissor Lifts



The problem, visualized

PROPOSED COMPONENTS

Lifting Mechanism
Mini Scissor Lift



Sliding Mechanism
Wheels

Safety Mechanism
Harness Tether

Attachment Mechanism
Locking Pins

OBJECTIVES

Vertical Reach	Adds 4-7 feet of vertical reach
Ease of Use	Can be set up by a construction worker within 5 minutes
Portability	Weighs less than 200 pounds
Durability	Lasts at least 5 years of usage at a construction site
Worker Support	Supports a total weight of at least 250 pounds
Safety	Complies with all applicable OSHA and ANSI safety regulations

PROTOTYPES

Used to visualize the scale of the final product.

Takeaways

- Lifting mechanism should be low enough to step on.
- The entry should open vertically.

Used to experiment with a pulley-based lifting mechanism.

Takeaways

- Pulleys can be easily unbalanced.
- Cables could be dangerous for workers' hands.

FINAL PRODUCT

Key Features

- Lifting Mechanism: Mini Scissor Lift
- Sliding Mechanism: Wheels
- Attachment Mechanisms: Locking Pins and Rails
- Safety Mechanism: Cage with Guardrails, Harness Tether

The lift is raised and lowered via lift and release poles, which can be accessed from within the cage

TESTS

Vertical Reach	**Ease of Use**	**Portability**
Measure total vertical reach added	Measure time taken to attach product to scissor lift	Remove, transport then reattach product
PASS 48 inches of vertical reach added	PASS Attached in less than 5 minutes	PASS Transported with ease

Durability	**Worker Support**	**Safety**
Strain product with continuous usage	Exert pressure on all supports and guardrails	Measure product lean angle based on internal leaning
TBD Alternative test needed	TBD Main platform supports 250 pounds	PASS Product leaned minimally

CONCLUSION

Numerous rounds of prototyping and iterative design sessions culminated in a final product that **successfully** allows construction workers to access spaces that they could not previously access due to the constraints of existing scissor lifts.

Our next steps for the product

- Increase the horizontal stability by adding supports to the current lifting mechanism
- Replace wooden components with lightweight steel
- Design a remote-operable control pad

ACKNOWLEDGEMENTS

The Scissor Lift Safety Extension team would like to thank the following for their continued support throughout the semester:

Duke	Steven McClelland	Ann Saterbak	Elizabeth Bucholz	Jennifer West	Mario Munoz
	Ryan Patridge	Murad Maksumov	Joe Nadeau	Kerry Castor	Bob Saterbak
Skanska	Evan Reilly	Boris Kiprovski	Shamar Drake	Spencer Hasenkopf	