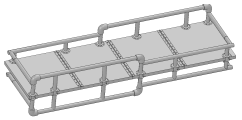


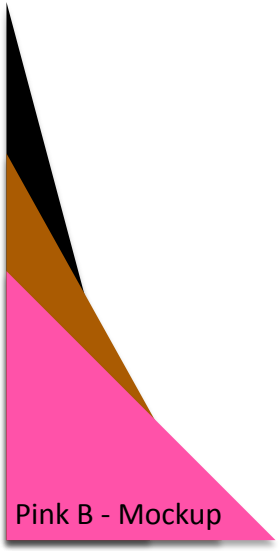
Flitter:

The Foldable Litter

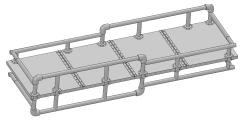


Flitter in Action





Customer Need



- In U.S. annually: 139 climbing accidents, 276 persons involved, 117 injuries, 23 fatalities

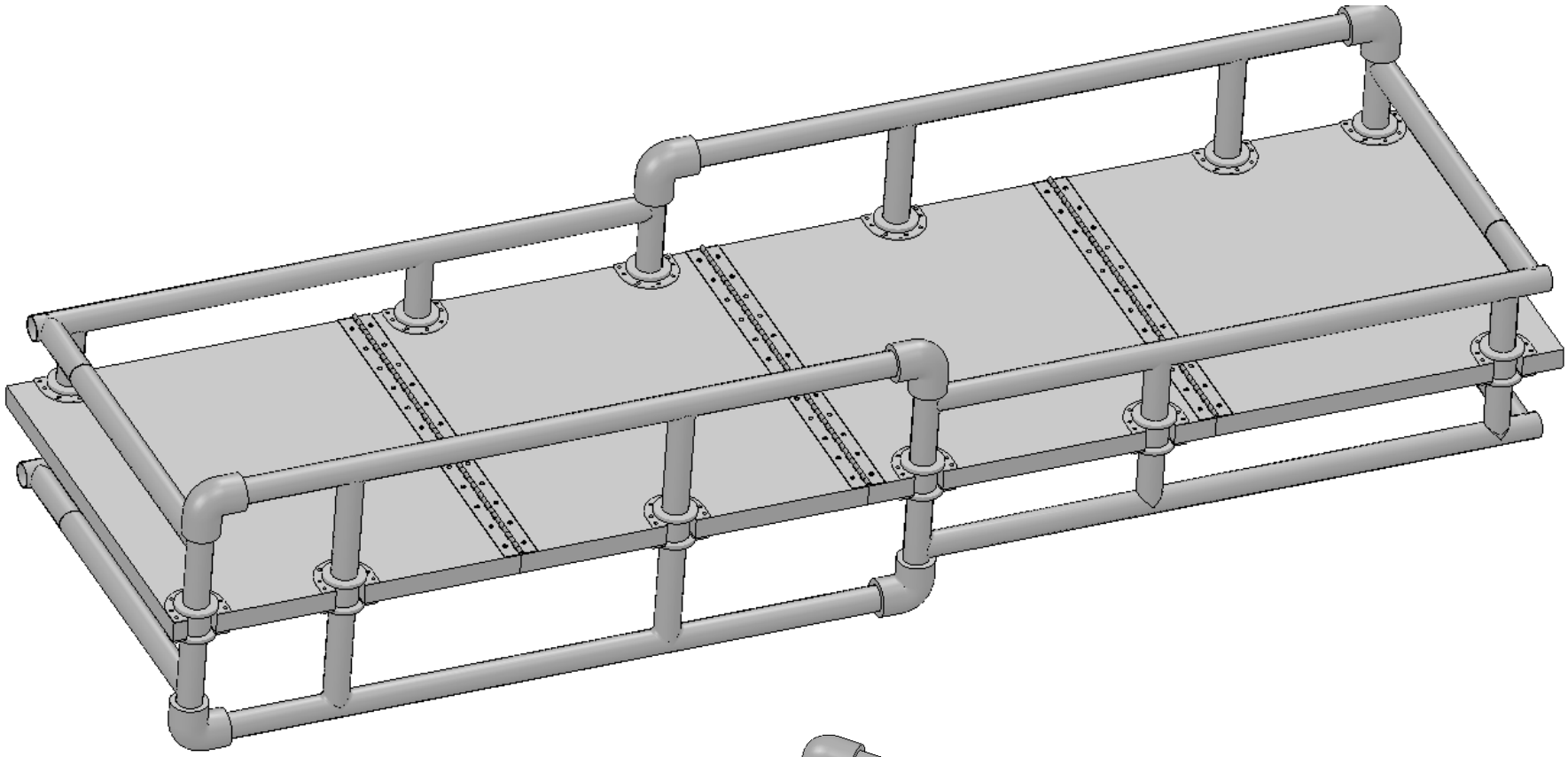
- 84 Mountain Rescue Teams in the US, 20+ personnel / team

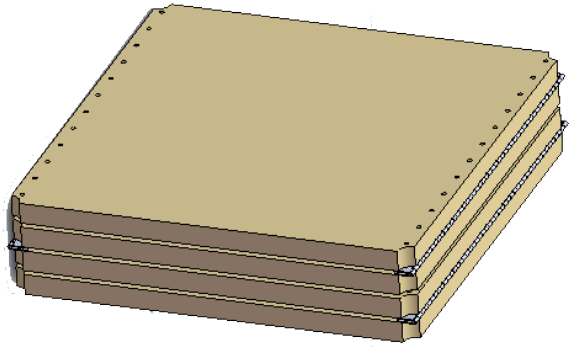
"I've often had to go out with a litter rescue team with a skeleton crew of just myself and two others. Naturally, a rigid, full size litter becomes a burden."

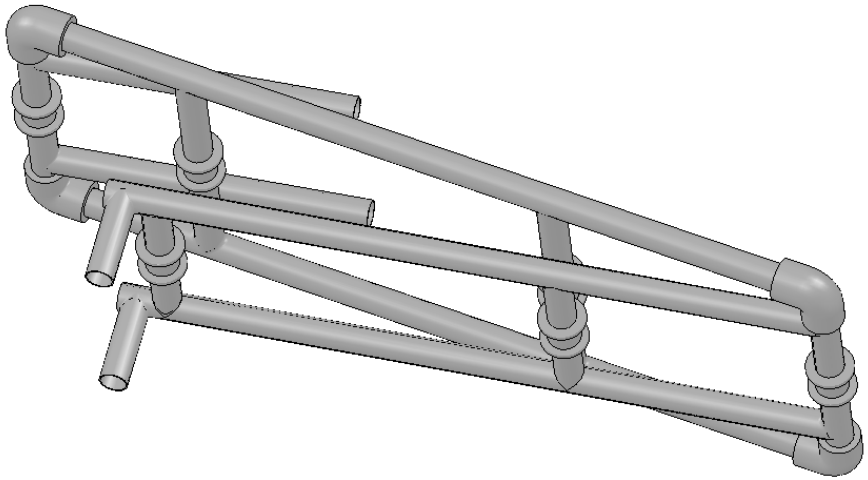
-Todd Remaley, Head Park Ranger
Appalachian Trail, National Parks and Services
10/14/2009

Pink B - Mockup

Source: American Alpine Club







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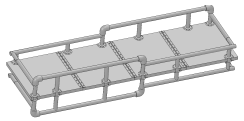

Product Contract

- **Product Description:** A modular rescue basket
- **Intended Customers:** Trained mountain rescue team
- **Market:** Emergency rescue equipment

Customer Needs	Product Attributes	EngineeringSpecs
Can be easily carried	Weight	< 20 lbs
Can disassembled into pieces	Modularity	> 4 pieces
User's freedom of movement	Module Size	Each module can be carried as a backpack
Rigid support for heavy weight	Rigidity of backboard	Withstand at least 220lbs (1 Meeker)
Competitive Price	Cost	< $600

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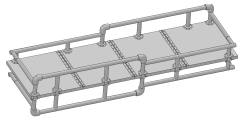
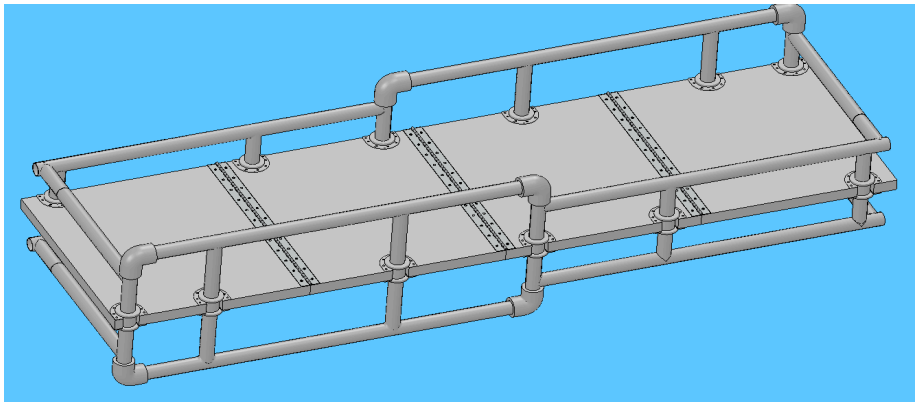


Risk 1: Lack of Rigidity

- Backboard buckling

- Joint Separation



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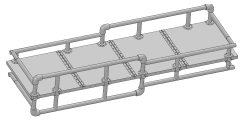
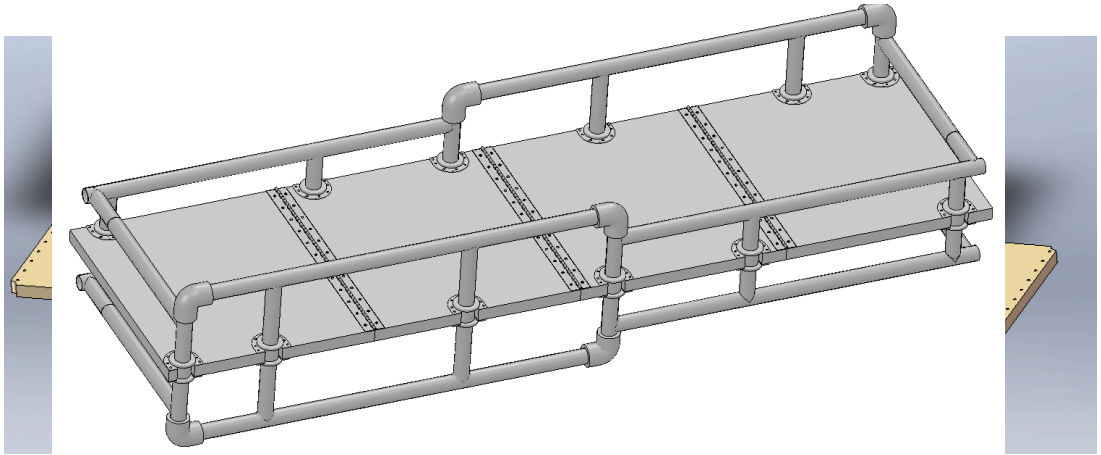


Risk 2: Weight Inhibiting Rescuer Mobility

- Heavier than competitive models
  - Mockup: 43lbs
  - Modular weight: 25lb, 9lb, 9lb

- Handlebars on all sides



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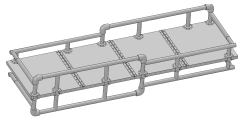
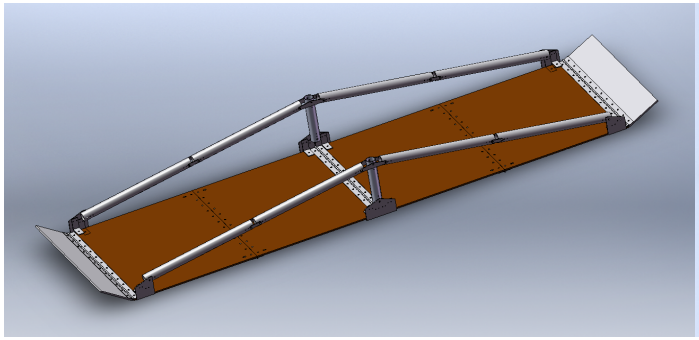
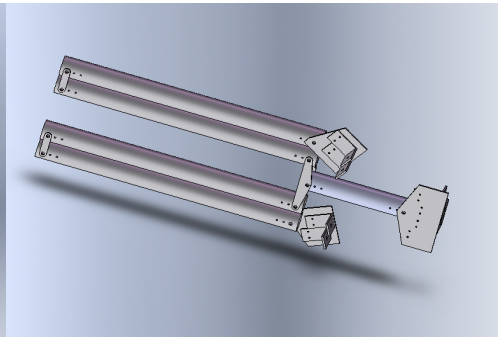
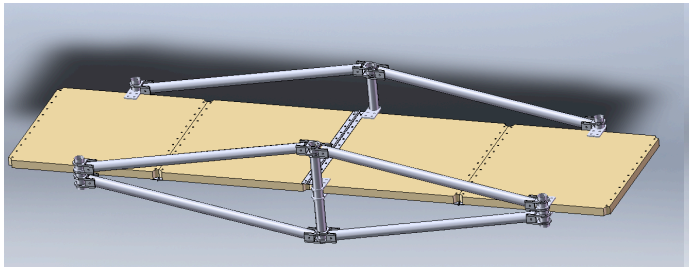
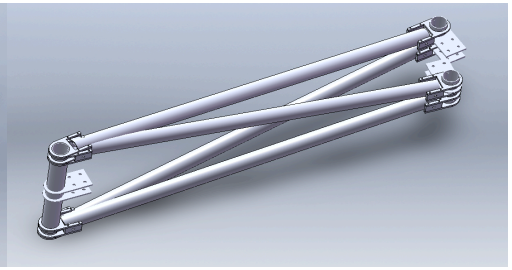


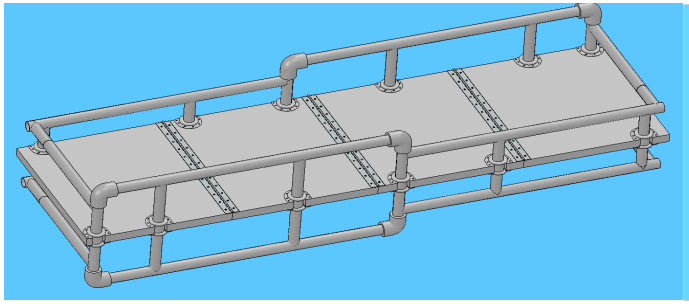
Evolution of Design

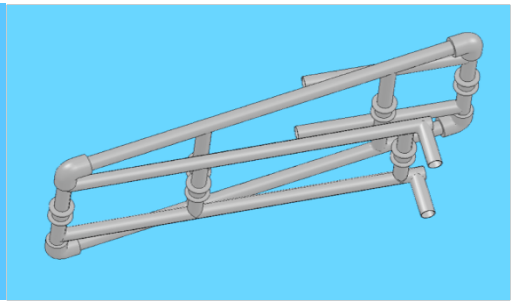












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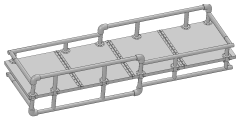
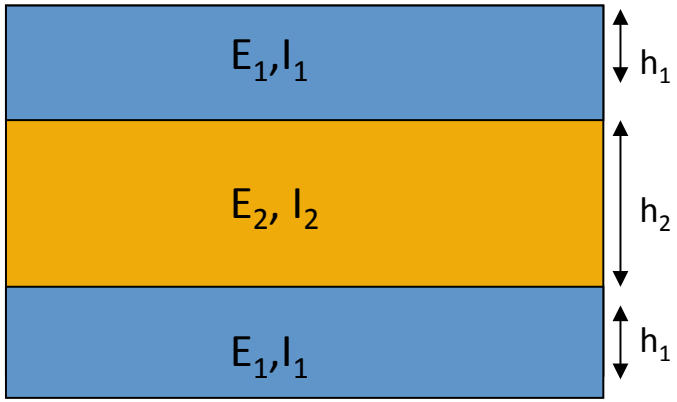


Stress Calculations



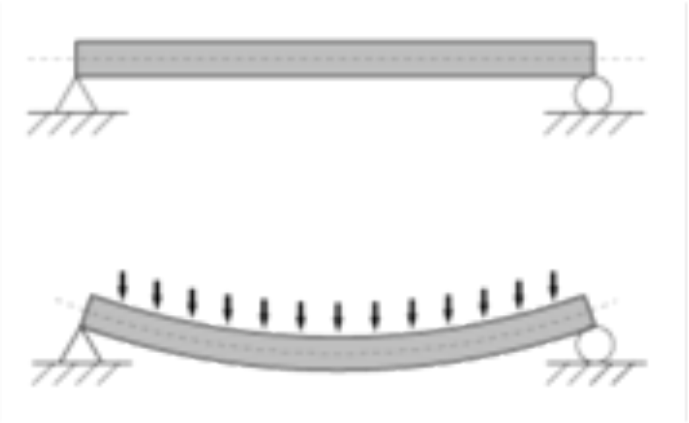
100 kg (220lb) Load:

- Max. Stress as % of Yield Stress
  - Plywood: 2%
  - Honeycomb: 58%

$$M = \frac{wL^2}{8}$$

$$\sigma_{core} = \frac{Mh_2E_2}{E_1I_1 + E_2I_2}$$

$$\sigma_{plywood} = \frac{M(h_1 + h_2)E_1}{E_1I_1 + E_2I_2}$$



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