ANEUVAS TECH. INC.
PORTABLE MEDICAL BENCH

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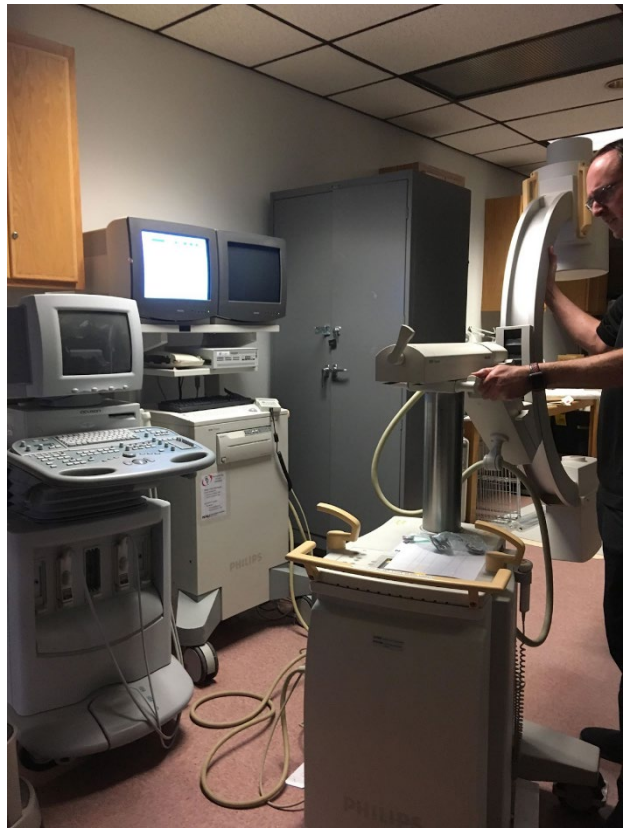
DR. BECKER - ADVISOR

Project Description



Dr. Becker's X-Ray Machine

Requirements

Compatible with medical machines

Support clean-room cover

Reduce shock during transport

Minimal X-Ray interference

Compliant with X-Ray machine

Clean Room Hood

Project Description/ Concept Generation

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How Concepts were Generated

Three Parts

- Wheels/Shock Absorption
- Tabletop
- Storage

Black-Box: Wheels

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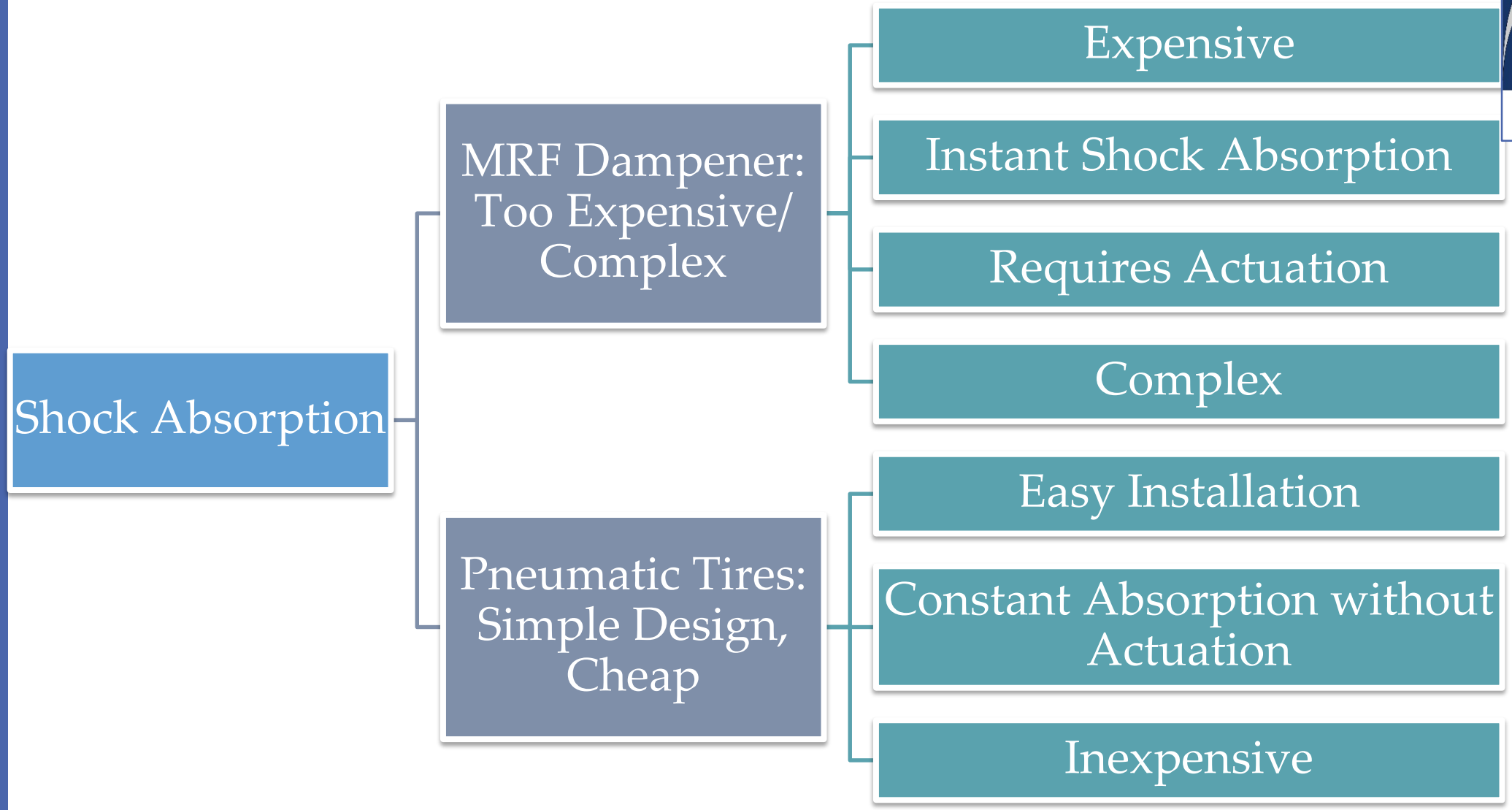
Material
Force
Design

Shock Absorption

Reduced Impact
Less Noise
Easier to Push
Better Turning

Decomposition Model: Wheels



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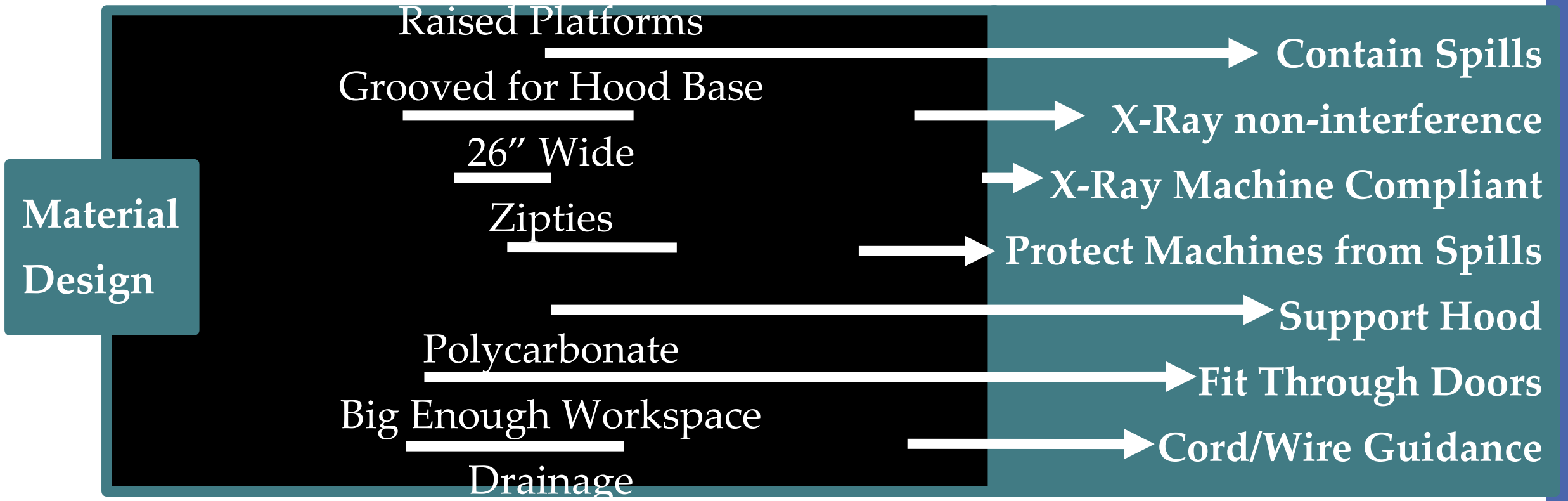
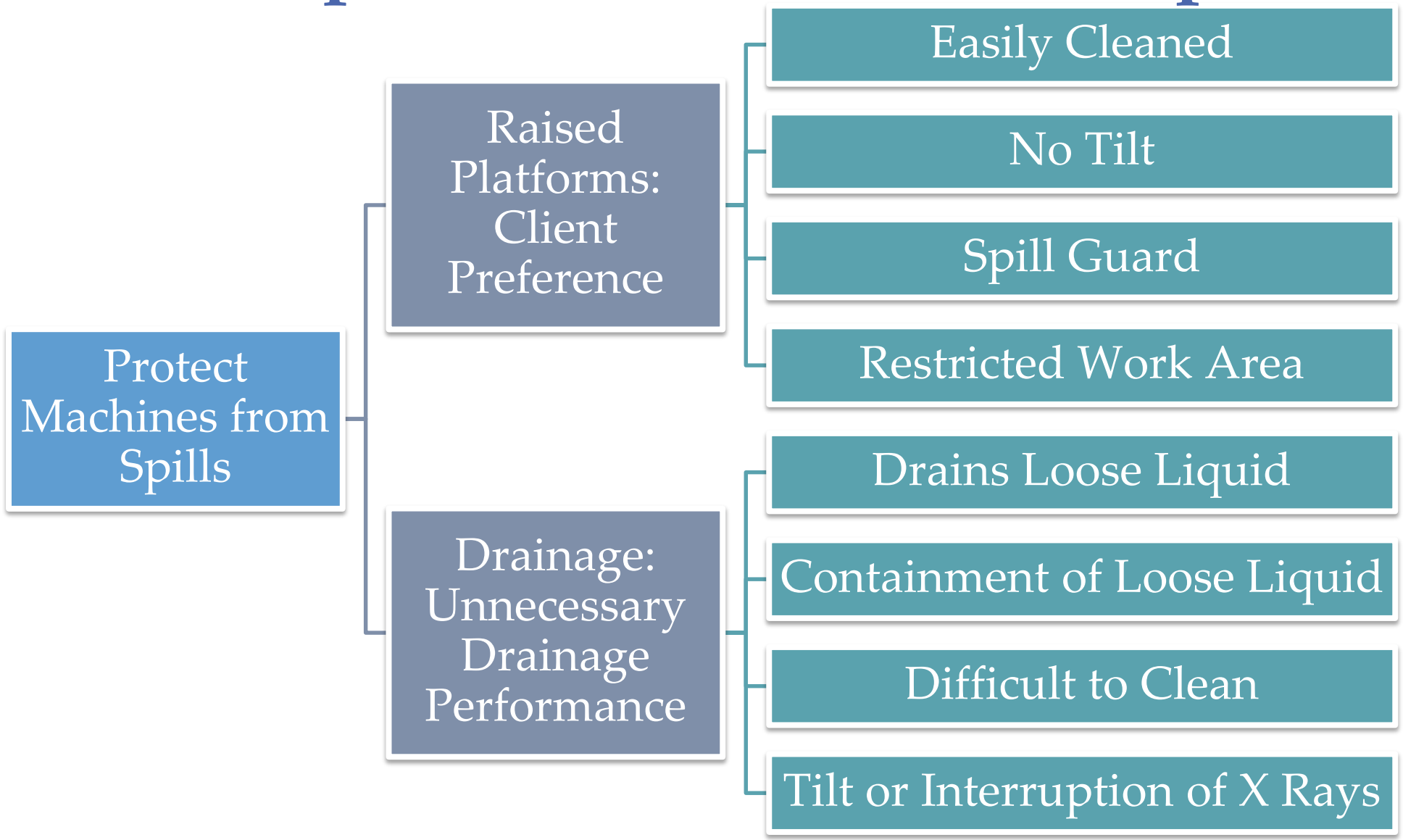
Black-Box: Tabletop



Decomposition Model: Tabletop (1)



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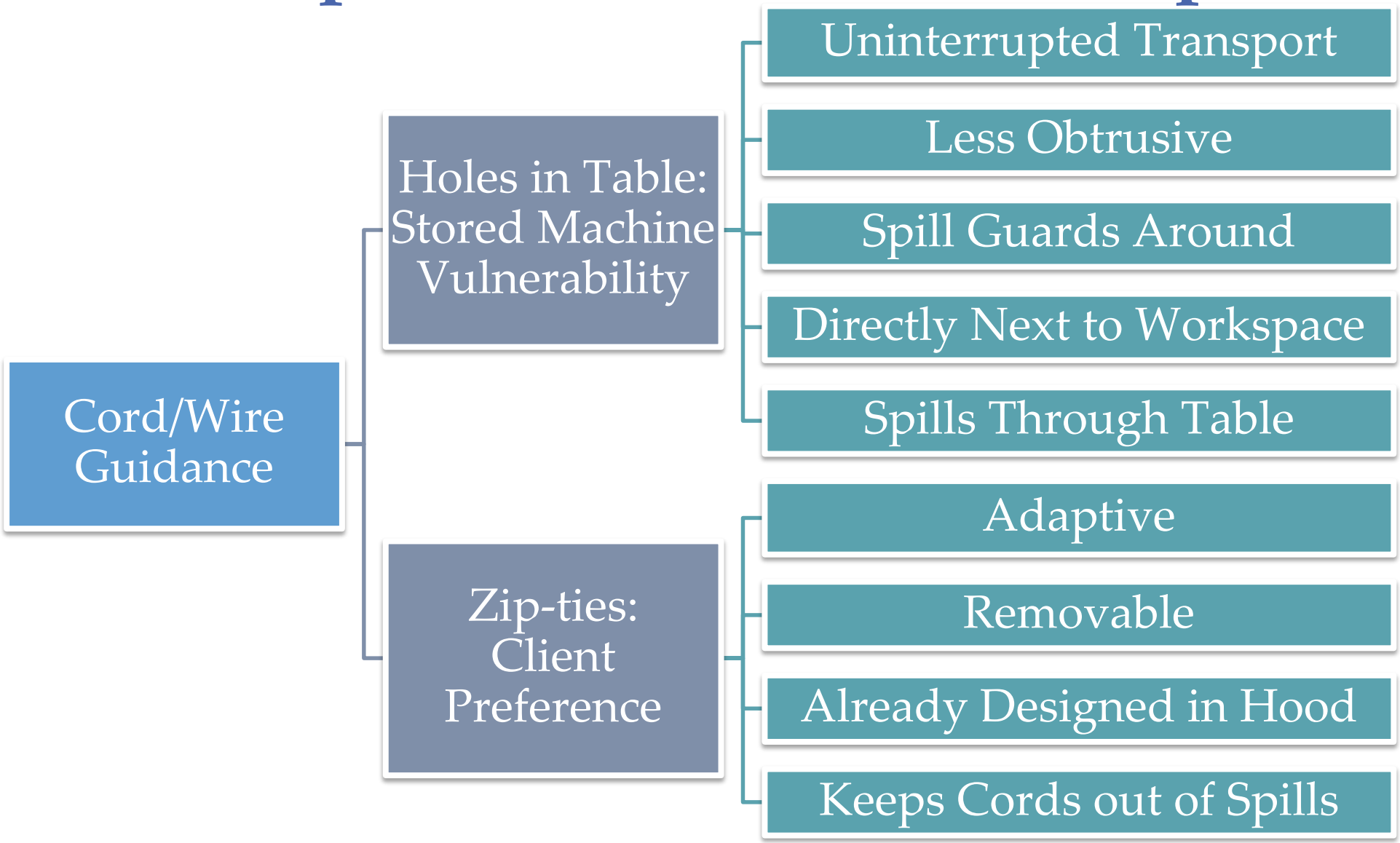
Decomposition Model: Tabletop (2)



Black-Box: Storage

Decomposition Model: Storage

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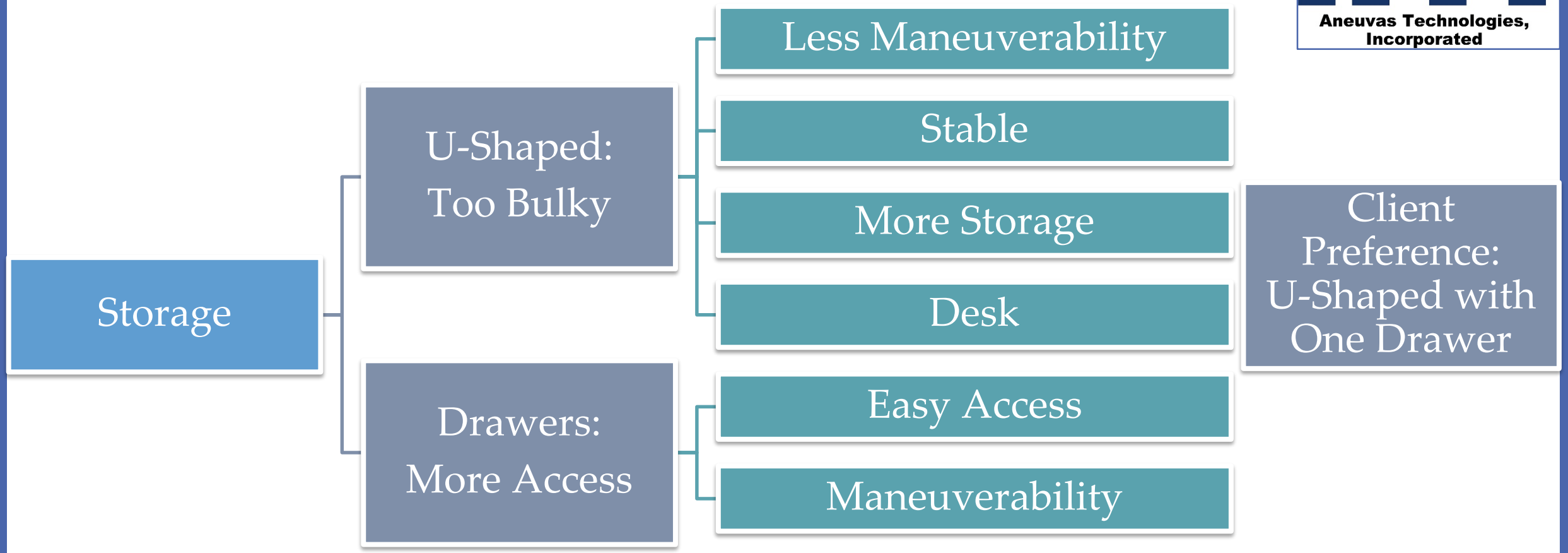

Concept Generation: Shock Absorption

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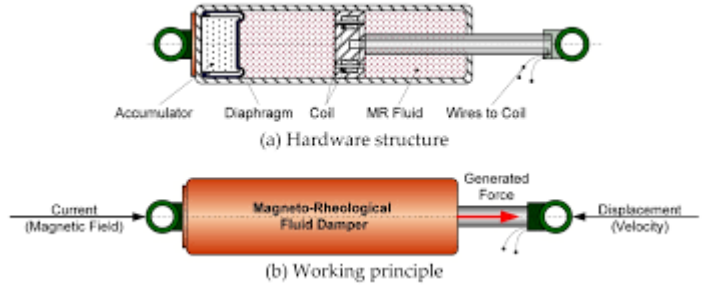
- Initial idea to implement MRF.
- Instantaneous shock absorption.
- Dr. Becker suggested this concept may be to complex for the need.
- Went with simpler and cheaper pneumatic tire design.



MRF Dampner

Concept Generation: Tabletop

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- Initial idea to make entire tabletop flat.
- Dr. Becker suggested we add in raised platforms on the sides.
- Increased stability and easier to clean if spills occur.
- Existing Polycarbonate piece for middle.
- Slots for hood to slide in.

Concept Generation: Storage

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- Initial idea to make U-shaped storage.
- Simple storage solution.
- Drawers that pull out instead.
- U-shaped storage with drawer on one side.

Concept Selection: CNs and ERs

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Customer Requirements

Durability

Reliability

Safety

Maneuverability

Inexpensive

Aesthetic

Multi-purpose

Lightweight

Engineering Requirements

Engineering Requirements

Cost

Weight

Volume

Yield Strength

Spring Constant

Deflection

Thickness

Temperature

Concept Selection: Decision Matrix

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Criterion	Weight	MRF Dampner	Pneumatic Tire	Raised Platform	Drainage	Zipties	Holes in Table	U-Shape	Drawers
Material Cost	0.25	5	15	12.5	12.5	12.5	11.25	12.5	12.5
Reliability	0.25	12.5	15	12.5	12.5	16.25	15	15	12.5
Instalation	0.1	3	6	6	5	5.5	5	5	5
Portability	0.15	7.5	7.5	7.5	7.5	6.75	6.75	9	9
Compatablity	0.25	7.5	15	15	12.5	12.5	12.5	12.5	15
Totals		35.5	58.5	53.5	50	53.5	50.5	54	54

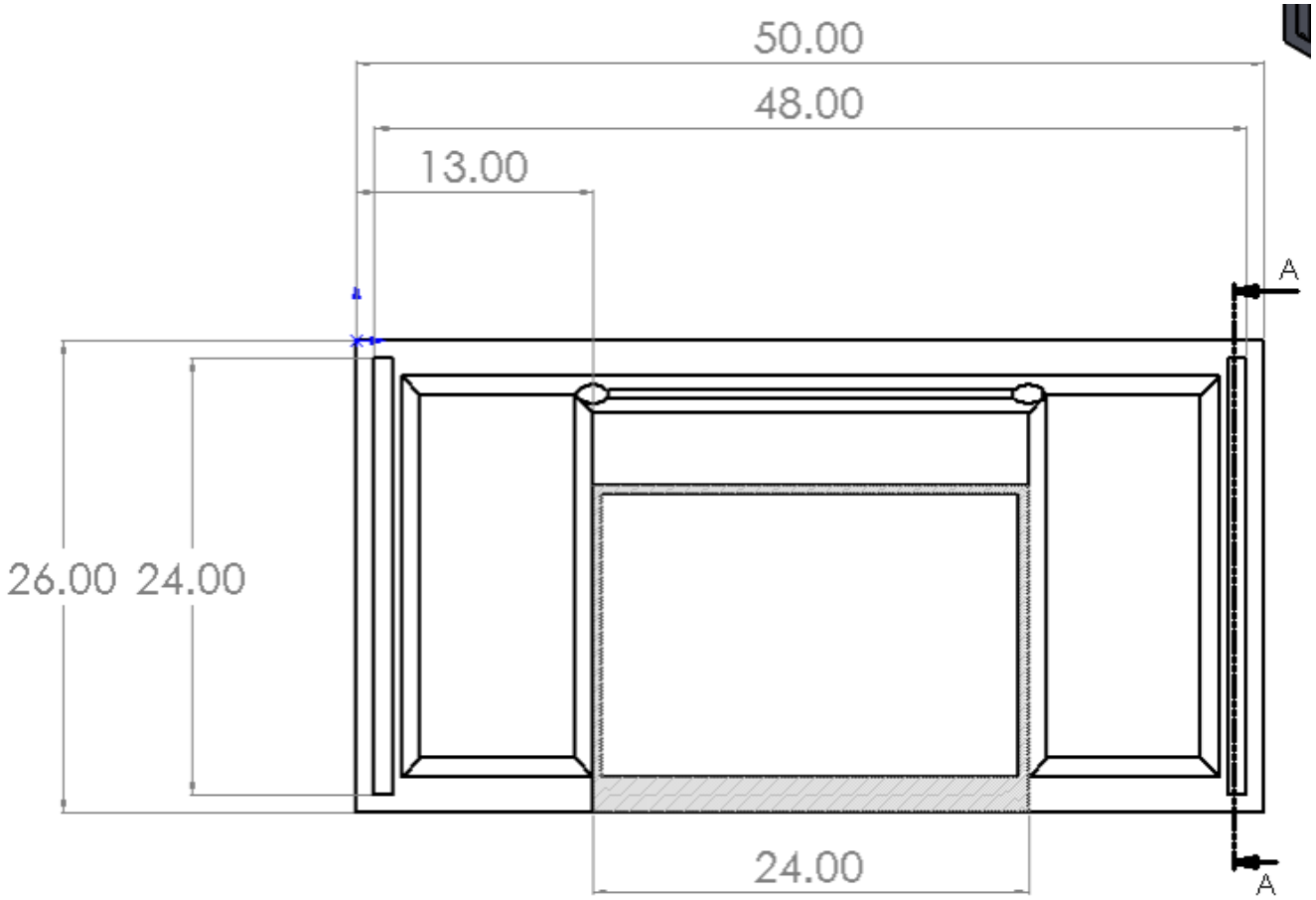
Raw Scores	MRF	Pnematic	Raised	Drainage	Zipties	Holes	U	Drawer
	20	60	50	50	50	45	50	50
	50	60	50	50	65	60	60	50
	30	60	60	50	55	50	50	50
	50	50	50	50	45	45	45	60
	30	60	60	50	50	50	50	60

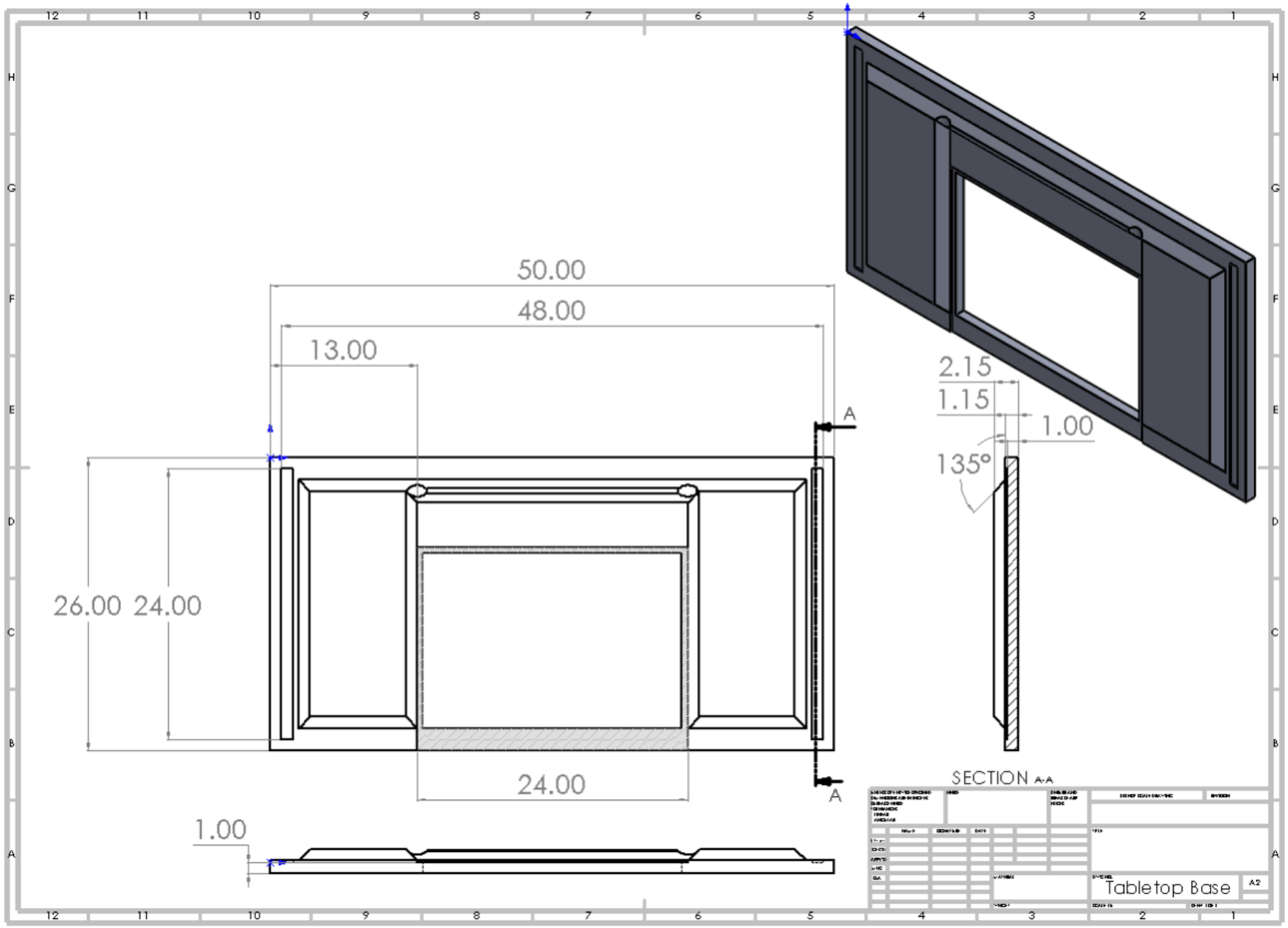
Concept Selection: Wheels

- After evaluation through the decision matrix as well as guidance from Dr. Becker, the pneumatic tire design was chosen.
- The design is much simpler and cheaper than the MRF dampner but offers adequate shock absorption .
- It will be easily installed to the bench design.

Pneumatic Wheel

Concept Selection: Tabletop CAD REV0





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Concept Selection: Storage CAD REV0

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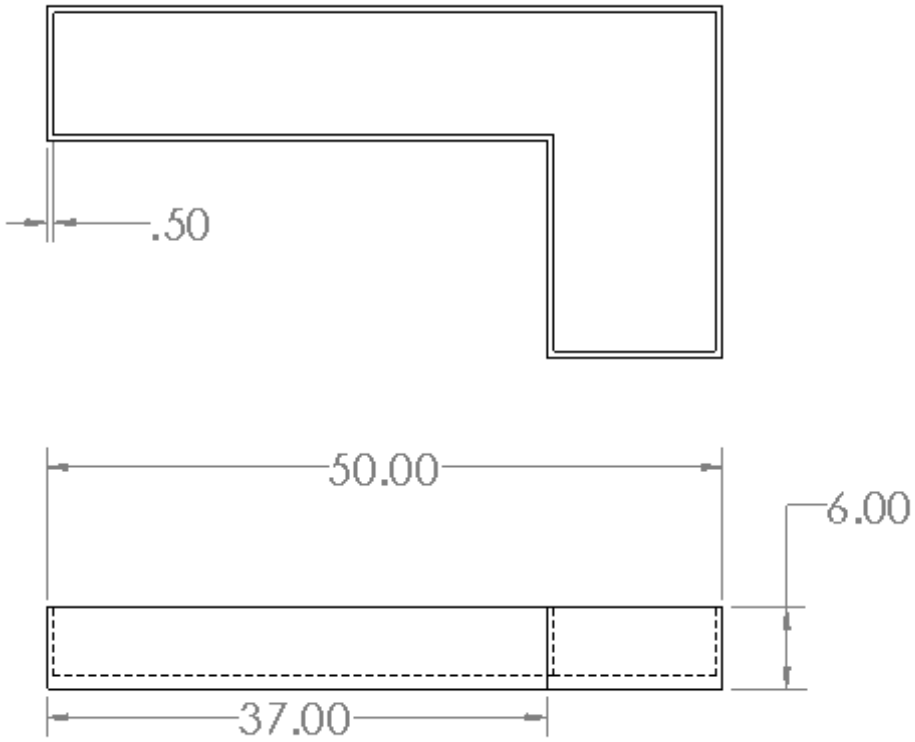

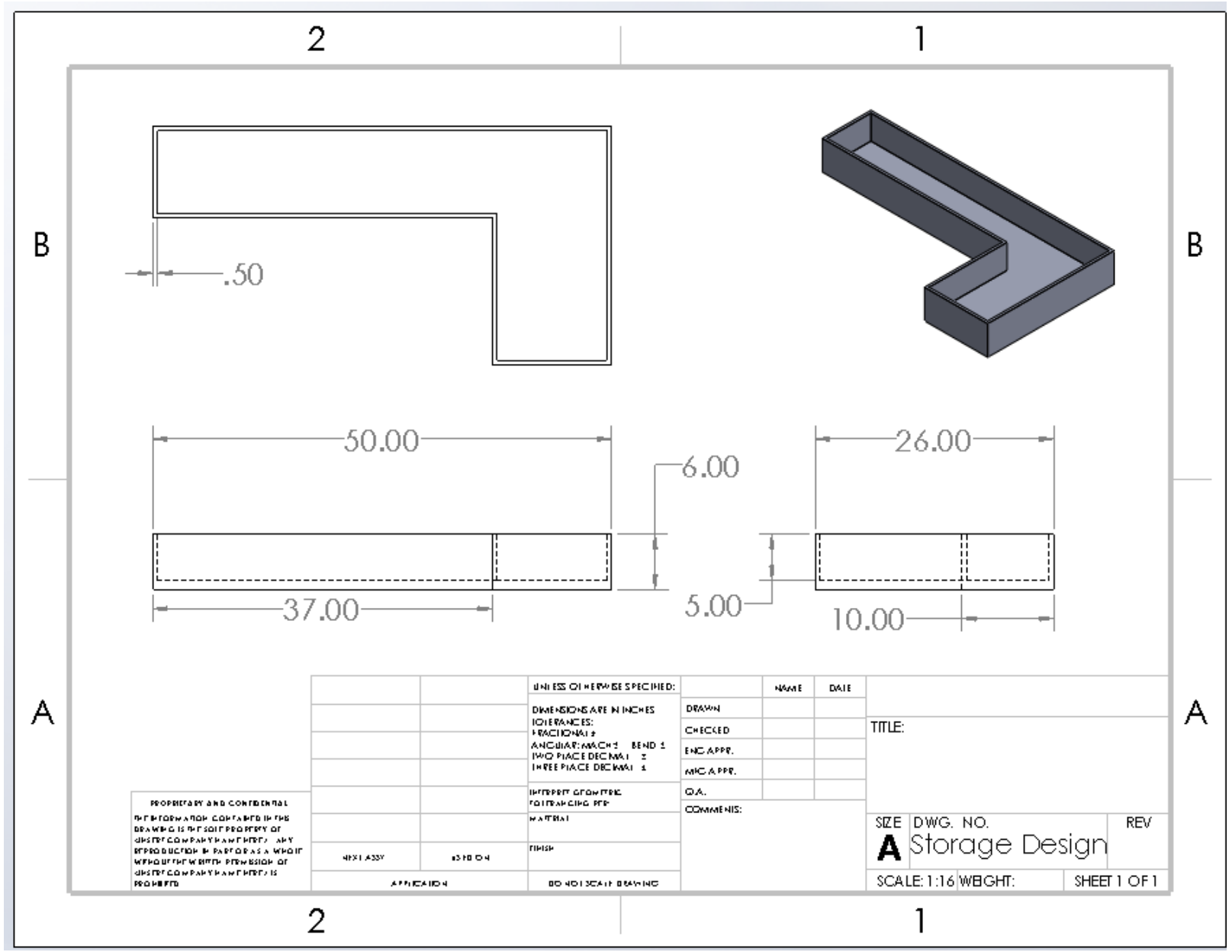

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Concept Selection:
Top Customer Requirements

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Safety	Durability	Reliability
Deflection	Weight	Volume

Budget Planning: BOM

- Tabletop (polycarbonate and another polymer/wood)
- Legs (wood)
- Pneumatic Tires
- Storage shelf (wood)
- Drawer (wood)
- Drawer slides and wheels (metal/plastic)
- Storage Cover (polymer)

Budget Planning

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Materials

- Tabletop (polycarbonate): $60*
- Tabletop (polymer/wood): $50
- Legs (wood): $20**
- Pneumatic Tires: $100**
- Storage shelf (wood): $30**
- Drawer (wood): $30**
- Drawer slides and wheels (metal/plastic): $30**
- Storage Cover (polymer): $30

Overall

- Materials: $350
- Spare Parts: $60
- Prototyping: $200
- Equipment: $200
- Contingency: $190

Total: $1000

** Prices based off McMaster-Carr [1]
* Prices based off Grainger [2]

Conclusion

- Through concept generation and evaluation our team was able to decide on design paths for the bench.
- Shock absorption, tabletop, and storage can now be in the developing stage.
- With CAD designs finished, the next step is discussing these design ideas with Dr. Becker to confirm his satisfaction and begin designing a prototype.

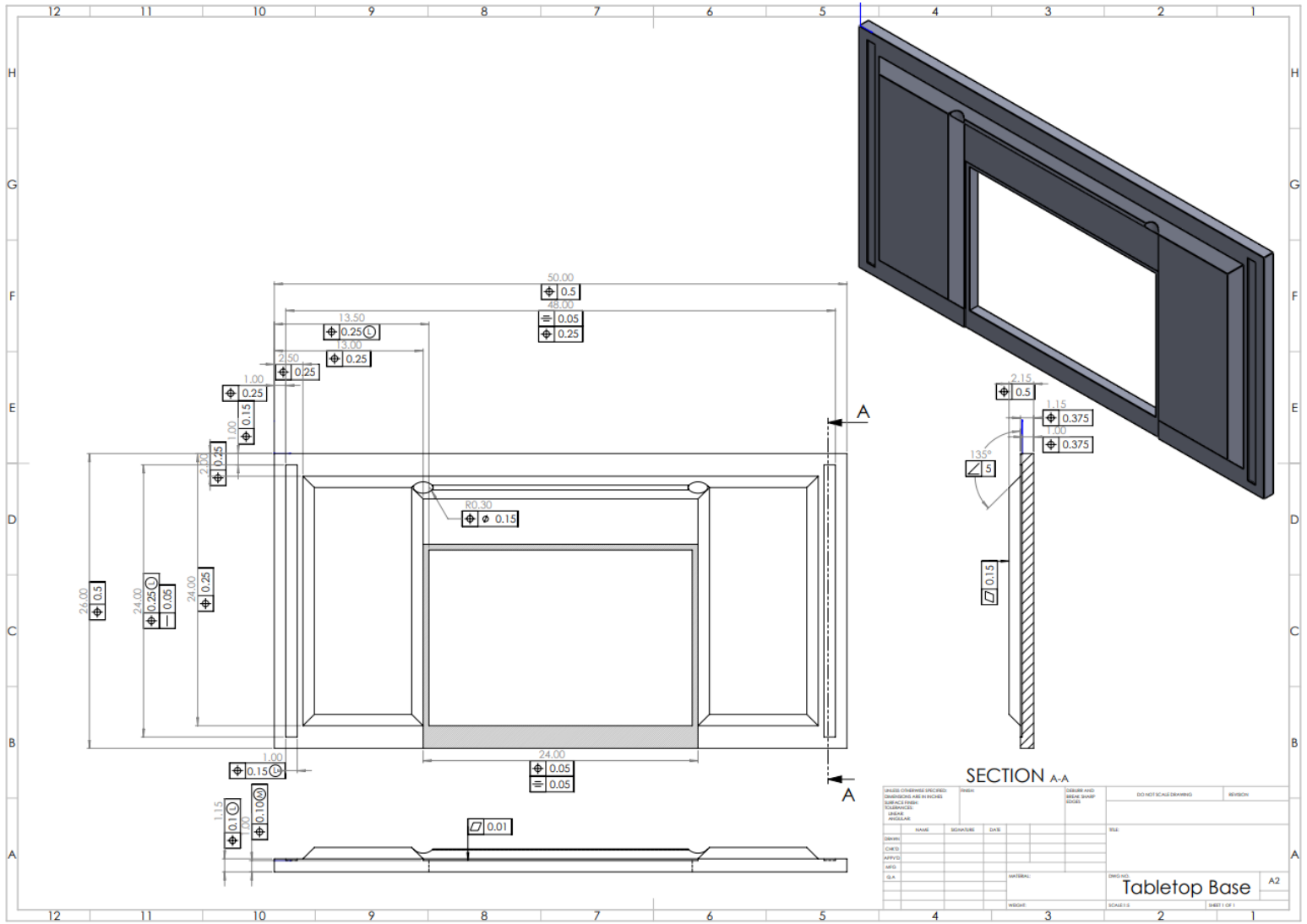
Questions?

Appendix

Citations

1. "McMaster-Carr,"[Online]. Available: https://www.mcmaster.com/. [Accessed: 03-Oct-2019].
2. "Grainger Industrial Supply - MRO Products, Equipment & Tools," *Grainger Industrial Supply - MRO Products, Equipment & Tools*. [Online]. Available: https://www.grainger.com/. [Accessed: 03-Oct-2019].

Appendix: Detailed Tabletop CAD



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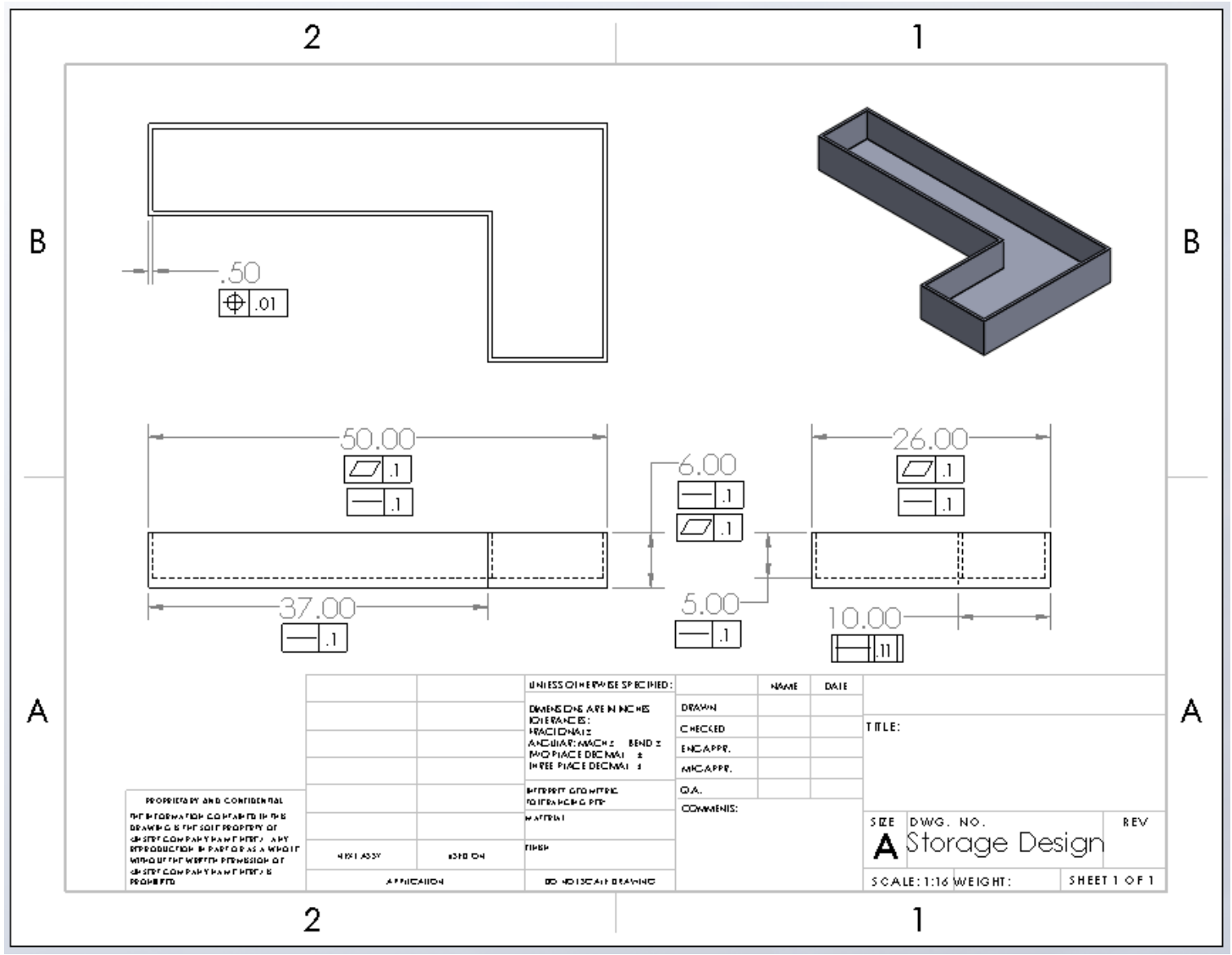
Appendix: Detailed Storage CAD



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