

# STABLE

Research

## Project Statement

A system for veterinarians to organize equipment and medicine in their vehicles for quick retrieval, is safe to use, and maintains secure disposal for medical waste.

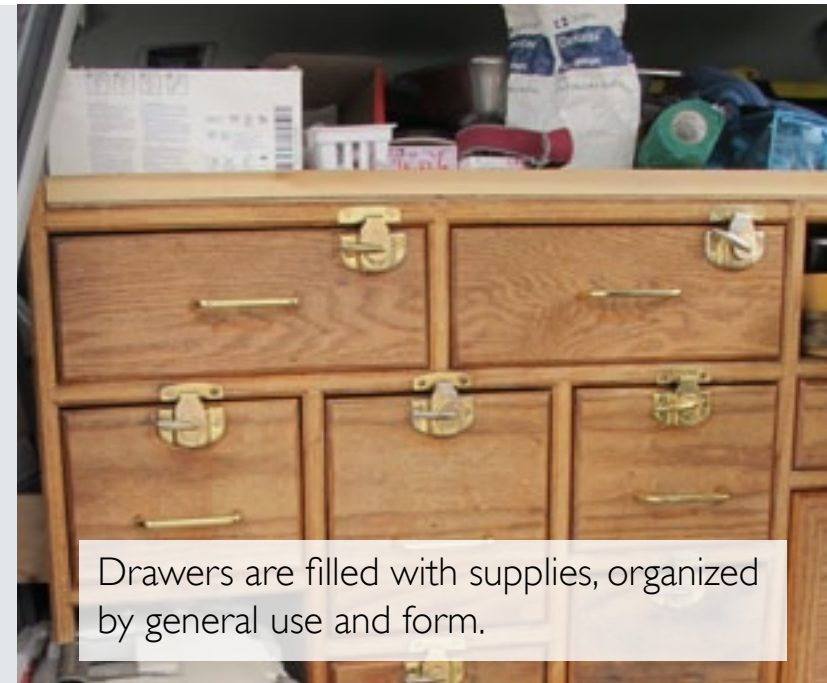
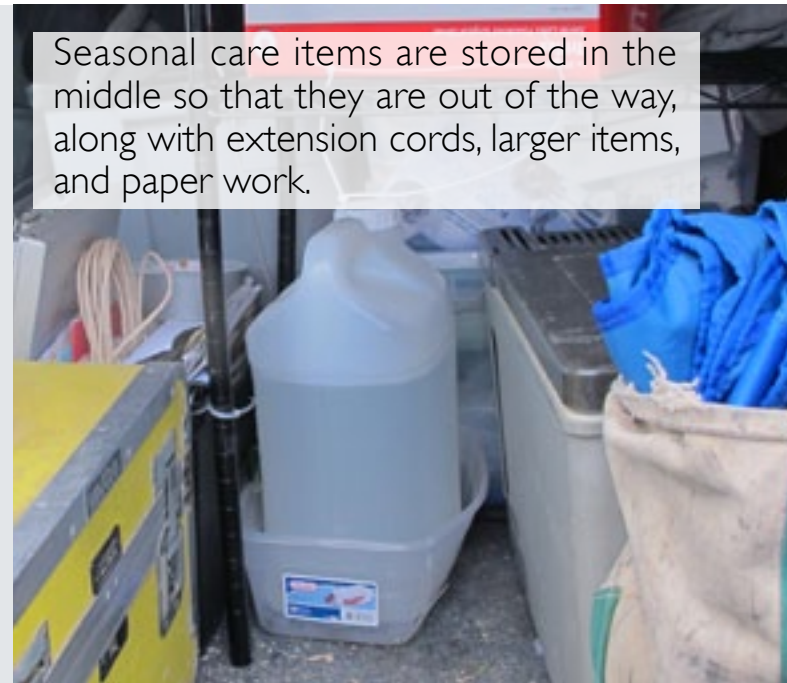
## Interview

In January, I went to the Wisconsin Equine Hospital and Clinic where I met with Dr. Marshall Stevens for a tour of the facilities.

## Typical Inventory

- Stethoscope
- Flashlights
- Files
- Needle Disposal Bins
- Laptop
- Disinfectant
- Syringes
- Gloves
- Needles
- Buckets
- Gauzes
- Medicines (Pills and Liquids)
- Cotton
- Vet Wrap (Bandage wraps)
- Medical Tape

A two-part, organizational device for large animal veterinarians making home visits. STABLE aides in the efficiency of animal care by providing an adequate, sanitary workspace and easy access to supplies and medicines.



## Inspiration



Product of Newell Rubbermaid



Product of Newell Rubbermaid

In human hospitals, instead of the nurse carrying all the medical supplies and medication, stationary 'homebase' cabinets are set up on each floor behind the nurse's station. Each nurse has a medical tower that they load based on who they visit that day. By doing their work this way, they do not have to take everything with them, only the necessary supplies. When creating a portable, medical storage device, this 'homebase' method is ideal to implement.



To understand organization with clean and used items, I looked at housekeeping carts for inspiration.



# STABLE

## Concept Exploration

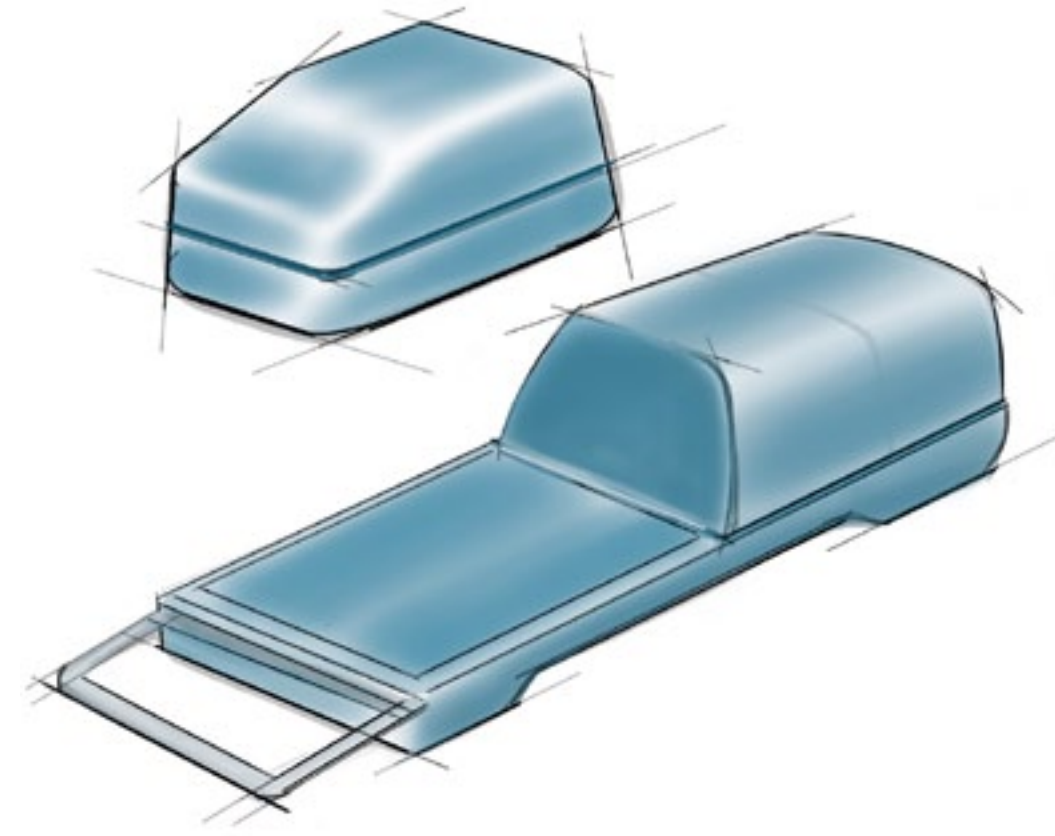
### Phase One:

Looking at one large portable section. Inspired by Ambulance Gurnees, this one piece would have automatic loader legs to make removal from the car easier. Locking drawers on the side keep supplies secure to the body.



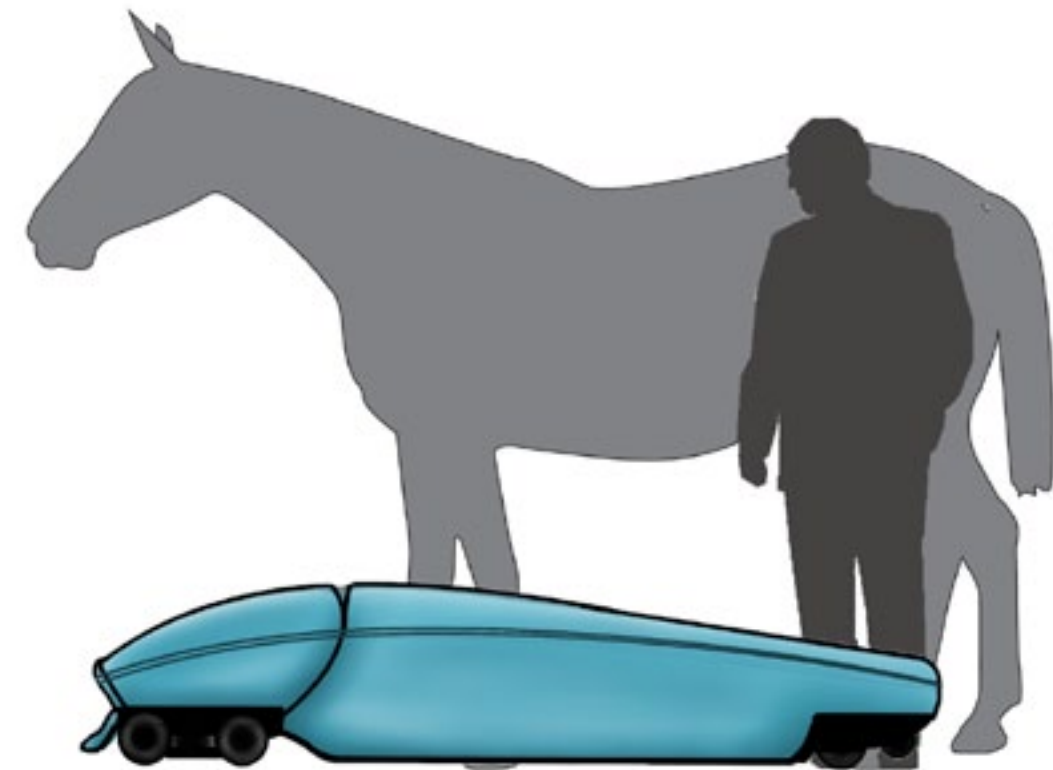
### Phase Two:

Exploration into a two-part product incorporating the 'homebase' method. Focus on overlaying pieces, stability, and function of parts. Emphasis on product silhouette to create a flow in the design.



### Phase Three:

Finalization of size and function. Focus on logical aspects such as stability during transport, sanitation of surfaces, and usability/interaction with veterinarian and horse.



# STABLE

Final Product

## Portable Cart and Storage Bin:

Cart rests at the front of the storage bin when in transit, but can be easily be removed for portable use.



Cart can be adjusted to three different levels, allowing the user to work anywhere around the horse with tools close by.



## Back Storage:

For larger items and seasonal supplies, there is a storage pocket at the end of the larger unit.

## Leg:

Support leg flips down when storage bin is pulled out to help balance the weight of the bin. This allows the veterinarian to keep the bin extended without worrying about weight issues.

## Cord Storage:

Cut-out in the side of the storage bin serves as a place to keep extension cords organized and easy to access.

## Locking Dock:

Track system sits in the back of a work vehicle and allows the larger storage to easily slide out for easy access. When in transport, the storage bin is locked in place.



# STABLE

*Final Product*

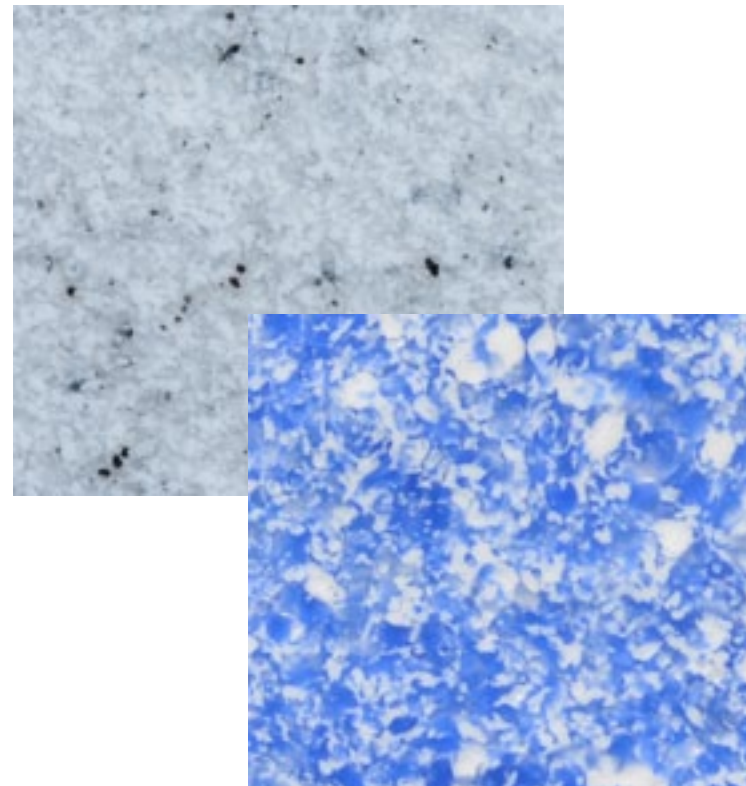
## The Possibilities:

Stable is not limited to only helping organize and transport supplies for veterinarians. It has the potential to be used for field research in science studies and equipment storage for campers and hunters,.

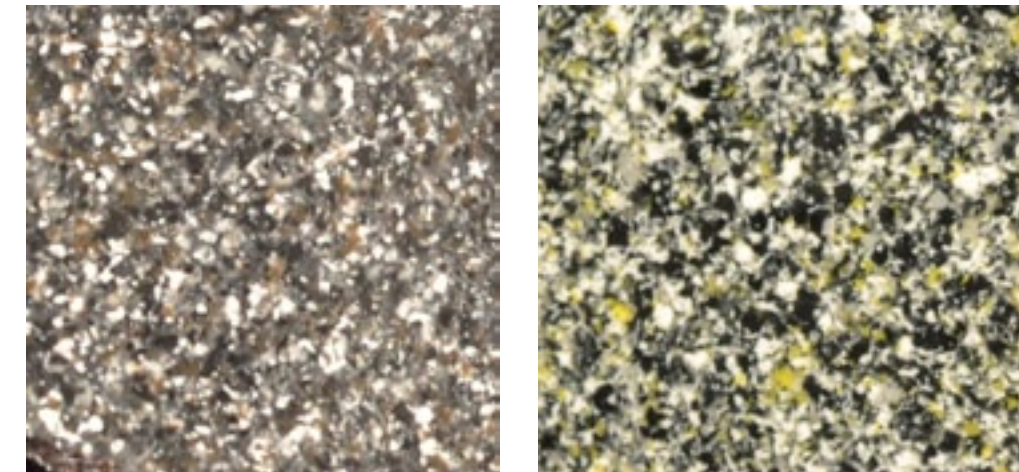


## Coloring Options:

Stable's versatility allows for any color. Choose two colors to making moving pieces pop or a single color to fit your outdoor needs.



Winsell Granite's 13148 and 14550 make a perfect match for user's who want a bold color combination in the work place.



Winsell Granite's 13160 or 13163 make a perfect match for the hunters or field biologists and researchers who want a color that blends with the outdoors.

A. Stable is a two-part storage device for large animal veterinarians that aides in the efficiency of animal care by providing an adequate, sanitary workspace and easy access to supplies and medicines. The device embodies the ‘homebase’ method, which is used in most hospitals today. The method requires one stationary storage unit, the ‘homebase’, that contains all the necessary supplies needed and a second storage unit that is portable. The nurse will load the secondary cart based on the patients that he or she will be visiting that day making visits efficient.

B. Rotational molding is ideal for the main storage unit and the body of the smaller, portable storage unit due to the low costs for equipment and tooling for products with large bodies. The benefit of the device being a plastic rather than metal or wood, will be easier to clean if any medicine, medical waste, or ointment was to spill on the device, as well as a lighter product for shipping purposes. By developing Stable with the rotational molding process, we can successfully bring even more attention to this manufacturing process.

C. Stable is the first of its kind, providing sanitary organization to large animal vets who perform home visits. Currently, vets use repurposed cabinets, office storage racks, buckets, and plastic bins to organize the back of their vehicles. The issue with using these products is that they can tip, make cross contamination easier, and create unused gaps between pieces, or wasted space. The main body of Stable will be rotationally molded and close to the length of a kayak. Attached to a locking dock, which is fastened to the vehicle floor, the larger unit is secure during transit and is able to slide out for easy access when ready to use. To support the weight of the larger body when extended out of the car, a metal leg folds down and easily folds back up when needed. On one side of the large body, a section will be cut out to allow for a metal insert to be placed. This insert will have two brackets that allow for an extension cord to be stored at the side of the unit. The back section will have space for larger bottles, such as disinfectant, and the front section, which will face the back of the vehicle, will provide a work surface to prepare paperwork and equipment for the vet. On the back wall of this space will be an insert where a sharps container and a garbage bin will attach, thus furthering the efficiency of the workspace. While in transit, the portable device will sit on the workspace using the metal frame attached to the bottom of the cart. This is to keep the work surface sanitary for medical preparation. The body of the portable device will also be manufactured using rotational molding due to its low tooling costs and easy cleanup. The lower half of the portable device will be made with metal set in an accordion structure to provide a strong base and allow the cart to be set at varying heights. The lowest height setting allows the veterinarian to work on the animals feet with tools close at hand, the medium setting reduces the amount of bending over the veterinarian has to do, and the highest setting allows the veterinarian to have the tools close to them when working from higher points such as the back. By having this function, the cart adapts to the user rather than the user adapting to the cart.

D. The storage units of both pieces are designed for rotational molding process. Slight drafts at the sides of the pieces make mold removal easier, while making the cord storage a cut out piece to reduce mold complexity. A calculated amount of polyethylene pellets will be poured into the mold and secured with a secondary mold part. Attached to a machine arm, the molds will be rotated and sent through the industrial oven where the pellets will begin to melt and coat the piece. This process usually takes anywhere between 45 minutes to an hour, depending on part size and wall thickness. For larger products, rotational molding is the ideal manufacturing process because it can accommodate large forms at a low tooling cost.

Estimation quotes provided by Matt Bushman from Plasticraft.

E. One of the biggest technical challenges overcome during the development of this project was making sure all the small parts, such as needle bins and cord storage, were incorporated while still meeting the requirements for the manufacturing process. For both details, additional parts needed to be added to the final piece after mold removal. This is to ensure mold efficiency and reduce mold complexity. One feature that makes this product successful is the workspace that is created from the body of the larger unit. No add-on is needed and instead the form of the product gives that section purpose and function. To give the product its color, additives are added to the pellet mix before molding begins. Additives, such as anti-static, can be added to the pellet mix as well. Since this piece is large and will bear a lot of weight due to storage capacity, the wall thickness will be 8 to 10 mm.

#### Tooling Costs:

	Part Price	Tooling Cost
Main Body	\$140	\$38,000
Doors	\$85	\$18,000
Sharps and Garbage Container	\$30 per container x2	\$12,000 per mold x2
Cart	\$50	\$13,000

Additional parts, such as the lower half of the portable cart, cord clip insert, and the locking dock, will be made using other manufacturing processes.