

The Dirt Dominator

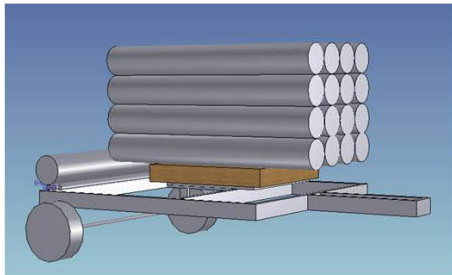
Logan Vaughn - Brandon Banks - Paul Stone
April 19th, 2007

The Problem

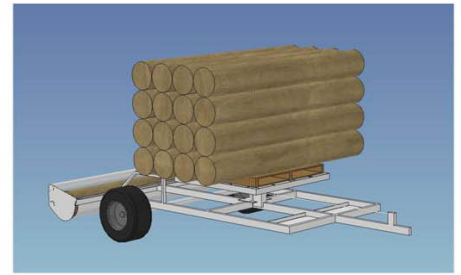
In the waterway erosion control industry there are two basic mediums for straw blanketing. There are “small rolls” that are 100 sq. yd. rolls that are 8’ wide and 112.5’ long and there are “big rolls” that are 444.4 sq. yd. that are 8’ wide and 500’ long.

Unlike the small rolls, the big rolls have a three inch cardboard core that using a simple trailer with a pin through the cardboard core, you can unroll the blankets with ease.

To this point there is no device that is used to unroll the small rolls. Manual labor is used to kick out the rolls, oftentimes crawling on the ground.



Initial Design



Final Design

The Deliverables of our Solution

1. A trailer mechanism that:
 - Has the capability of being towed behind an ATV
 - Increases the speed of blanket installation
 - Has the capacity to carry a full pallet of blanketing rolls
 - Reduces manual labor
 - Has a lighting system that allows for longer work days
2. Blueprints and documents necessary to manufacture more trailers.

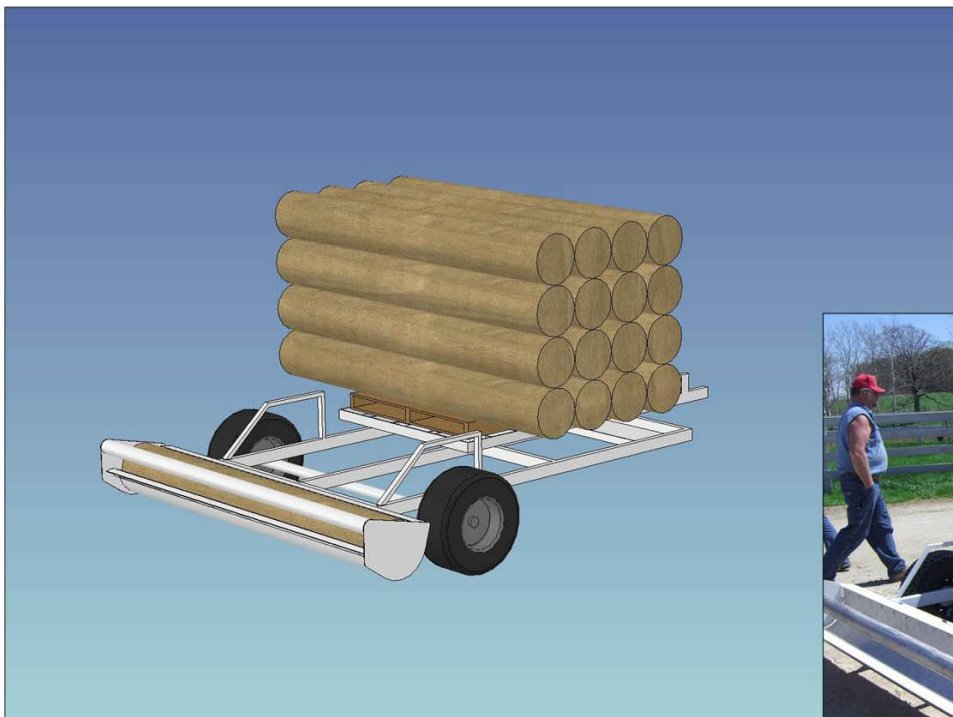
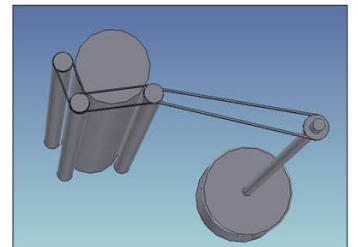
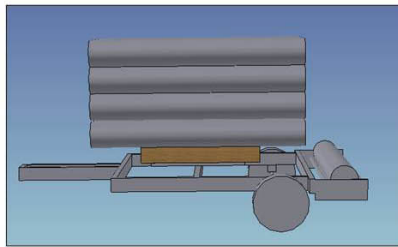
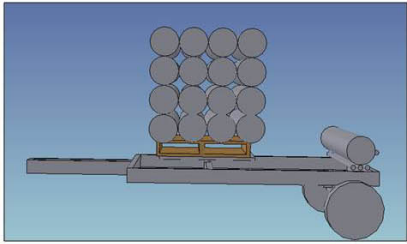
Our Solution

Small rolls come on a pallet of four wide stacked four high, a total of sixteen rolls. Our plan is to design and test a trailer with the capacity to hold a full pallet of rolls. The trailer will hold the pallet and put the worker in an easily operable position to eliminate as much manual labor as possible.

Our unrolling station will consist of a 96" wide stainless steel tray that will provide a low friction surface to allow the blanket to unroll easily. The dispensing station needs to be low to the ground during operation because it can be very difficult to lay the blanket on the ground with any wind. We would also like to add adequate lighting to the trailer so that night time operation would be possible, should that need exist. The trailer will be towed by an ATV which has a maximum hitch load of 835 lb; it will also be our 12 volt power source for lighting.

Our first objective was to determine if the rolls needed a drive system to assist in the unrolling process, or if they could lay in a pan and simply unroll from the force of the material being pulled off. So we purchased a piece of soft-core field tile, and made a prototype pan, and the material unrolled with ease. This meant a drive system was unnecessary.

Early Developed Drawings

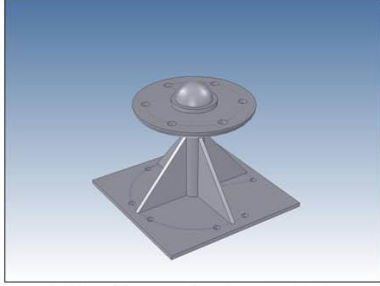


Final Design



Our Final Product

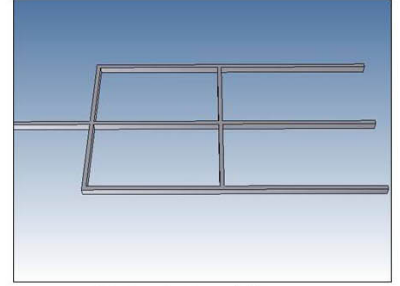
Below are multiple 3D renderings of parts before construction and their corresponding photos during the assembly and construction process.



3D Rendering of rotating pivot



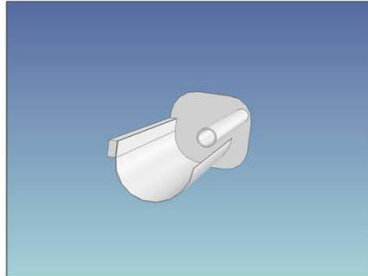
Axle and frame during construction



3D Rendering of frame



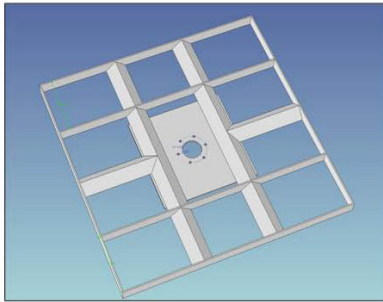
Rotating table during construction



3D Rendering of dispenser assembly



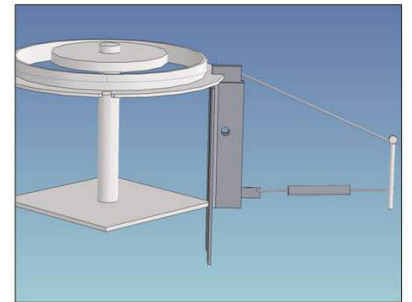
Dispenser assembly during construction



3D Rendering of rotating table



Latch assembly during construction



3D Rendering of latch assembly

Product Evaluation

On the weekend of April 1st, we had scheduled to take our trailer to a jobsite where Holtkamp Erosion Control was currently installing straw blanketing, but because of prevailing weather, we instead took it to Holtkamp's home farm and ran an abbreviated test, unrolling some blanketing in a grass pasture.



Load the trailer



Release and turn the table



Put in the roll back stops



Drop a roll into the dispenser



Start to unroll



End of the roll