

JOMA Acres Grain Facility

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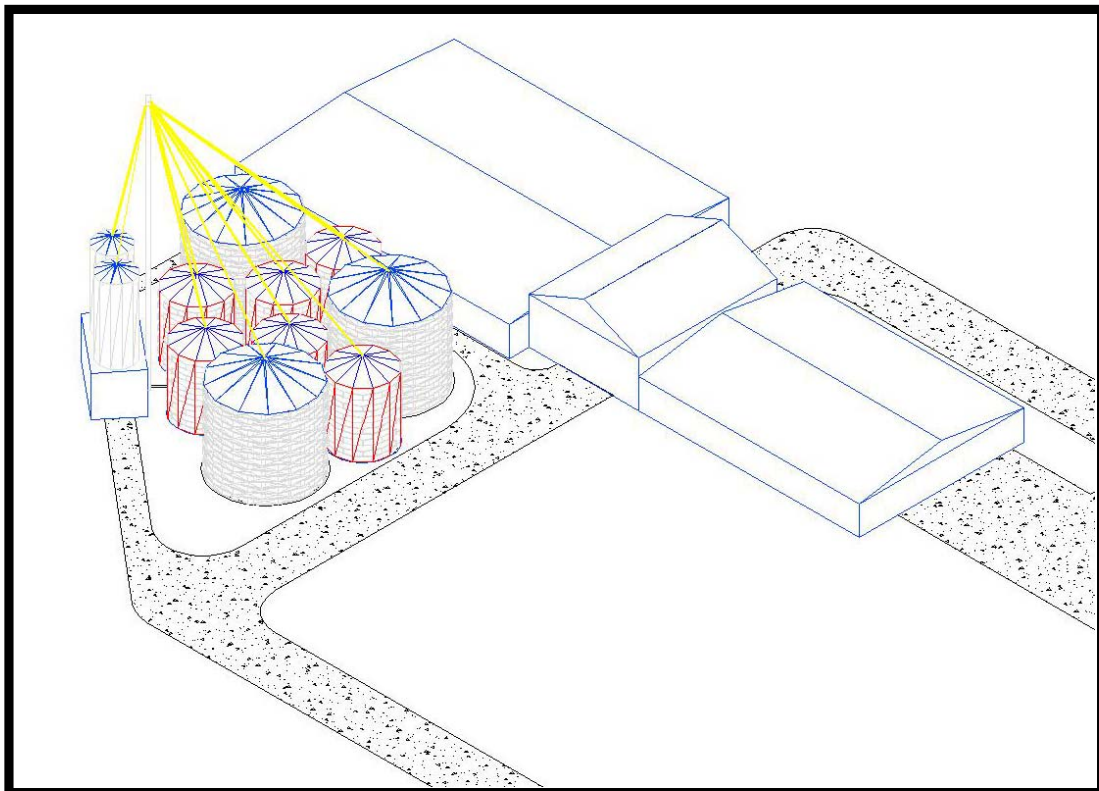
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Problem:

- To design a grain handling facility that will meet future levels of grain production and disassemble a 70,000 bushel grain bin, which will be included in the newly designed facility.

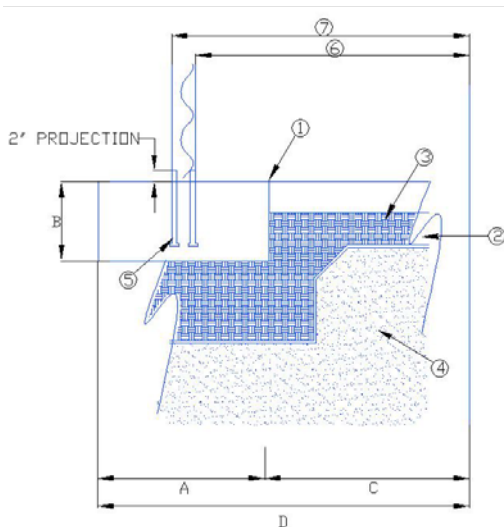
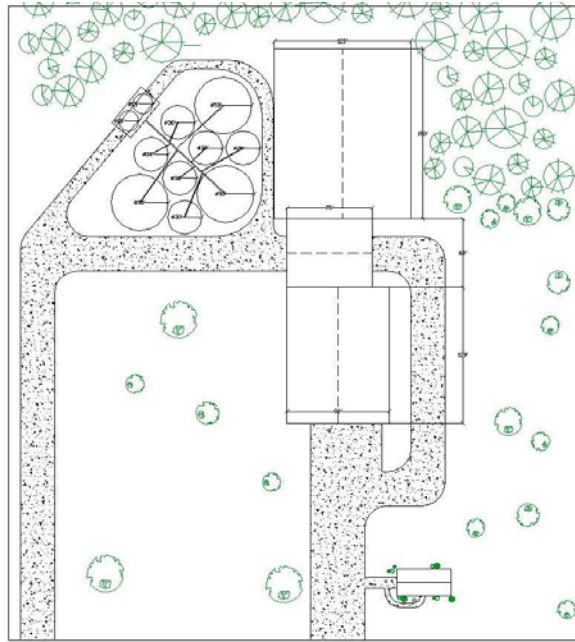
Main Objectives:

- Prepare schematics of the current farmstead layout.
- Design schematics of the grain facility including future expansion
- Disassemble, engineer reinforcements, and prepare site to erect the 70,000 bushel grain bin.
- Design the site layout including the new grain facility



Site Layout with Grain Facility

- This draft shows the future grain facility and current buildings.
- The facility handles 300,000 bushel capacity
 - 3- 70,000 bushel bins
 - 6- 15,000 bushel bins
 - 2- 8,000 bushel holding bins
 - 20' x 40' superstructure
 - 136' 3600 bushel/hr grain leg



Cross-Sectional View of Foundation

- A FOOTER WIDTH 32"
- B FOOTER THICKNESS 15"
- C INSIDE FOOTER RADIUS 22'-6.5"
- D OUTSIDE FOOTER RADIUS 25'-2.5"
- 1 EXPANSION JOINT
- 2 6" BASE MATERIAL
- 3 VAPOR BARRIER
- 4 UNDISTURBED SOIL OR ENGINEERED BACKFILL
- 5 ANCHOR BOLT 5/8 X 13" HEAVY HEX HEAD ANCHOR BOLT (GRADE 5)
- 6 INSIDE STIFFENER (BOLT CIRCLE RADIUS) 23'-10.75"
- 7 OUTSIDE STIFFENER (BOLT CIRCLE RADIUS) 24'-1.25"

70,000 Bushel Grain Bin

- Shows grain bin fully assembled
- Grain bin is 16 rings tall
 - 43' tall on eve
 - 55' at the peak
- Grain bin has 16 panels per ring
 - Panels are 32" x 9'
 - 48' diameter
- 194 wall stiffeners inside
- Grain Bin has approximately 20,000 bolts





Disassembling the Grain Bin

- 8- 2 ton hoist bin jacks were used to elevate the bin
 - when raising or lowering the bin it is critical to keep them even to distribute the weight of the bin properly
- After 2 rings were taken off the brackets holding the bin had to be repositioned 2 rings higher on the bin
- Prior to rings being taken off the stiffeners had to be unfastened and removed from the inside
- All of the panels and stiffeners were numbered to their corresponding position and stacked on a trailer to be moved

Site Preparation

- The optimum location for the grain facility was located in an area that needed to be cleared
- We cleared the trees to make it ready for aggregate to be brought in



Modification of Stiffeners

- Some bottom stiffeners were bent or bowed out due to stress from the weight of the grain bin
- 1.5" x1.5" x .25" thick angle iron was welded on to the area of the stiffeners that experienced the most stress



Completion of Deconstruction

- After 15 rings and the roof panels were removed the roof structure had to be disassembled
- Scaffolding was erected in the center of the bin to support the center of the structure
- Stiffeners were removed
- The z-girts were then unfastened from the top and bottom rings
- The bottom ring was then disassembled