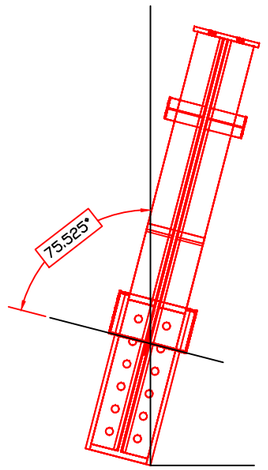
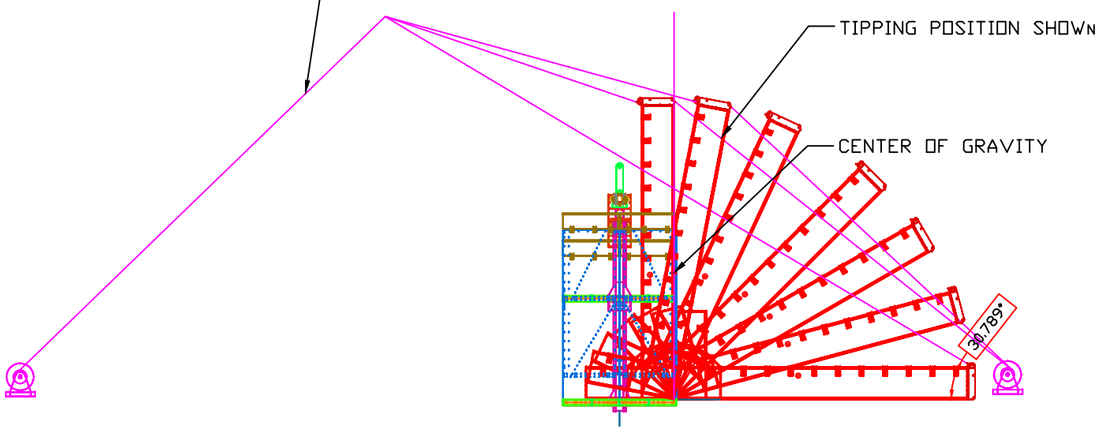
1. SET BOTTOM DECK ON CHAIRS, HAVE MIDDLE DECK REMOVED, AND OPEN EAST SIDE OF BONNETS
2. SET ONE CR0005 ON A TRUCK AND ROLL THROUGH CAGE COMPARTMENT WITH LONG LEG POINTING FORWARD
3. ANCHOR THE TRUCK AND CONNECT THE CONTROL LINE WINCHES, THE HORIZONTAL LINE PULL VECTOR WILL BE HIGH
4. BEGIN LIFTING AND PAYING OUT WINCH LINE AS NECESSARY TO HOIST BEAM INTO VERTICAL POSITION, THE SHORT SIDE WILL REST ON FLOOR
5. STABILITY OF THIS ITEM WHILE TRANSPORTING AND HOISTING IS MARGINAL, MAY NEED TO BUILD A DEVICE TO HOLD IT STEADY
6. INSTALL THIS DEVICE JUST BELOW THE TOP OF THE CAGE, COULD BE SIMILAR TO A SPREADER.
7. LOWER CAGE TO THE 4850L AND REVERSE PROCESS.



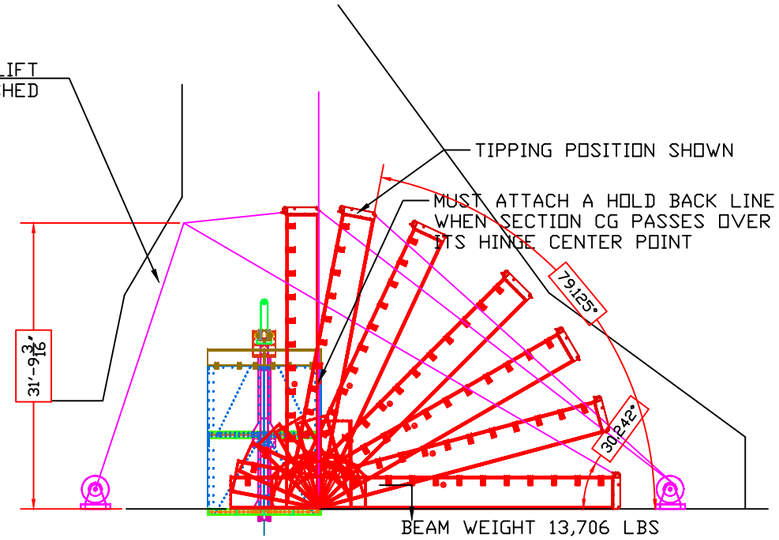
STABILITY DIAGRAM OF CR0005

LINE TENSION 11,260 LBS TO START LIFT
TENSIONS DECREASE AFTER INITIAL LIFT



CORNER BEAM LW CR0005 BEING LIFTED INTO CAGE AT SURFACE
CR0035 AND CR0036 ARE SIMILAR 39 PCS OF THESE

MAXIMUM LINE TENSION 11,450 LBS AT END OF LIFT
TENSION IS LOW UNTIL TIPPING POINT IS REACHED



CR0004 BEING UNLOADED AT 4850L

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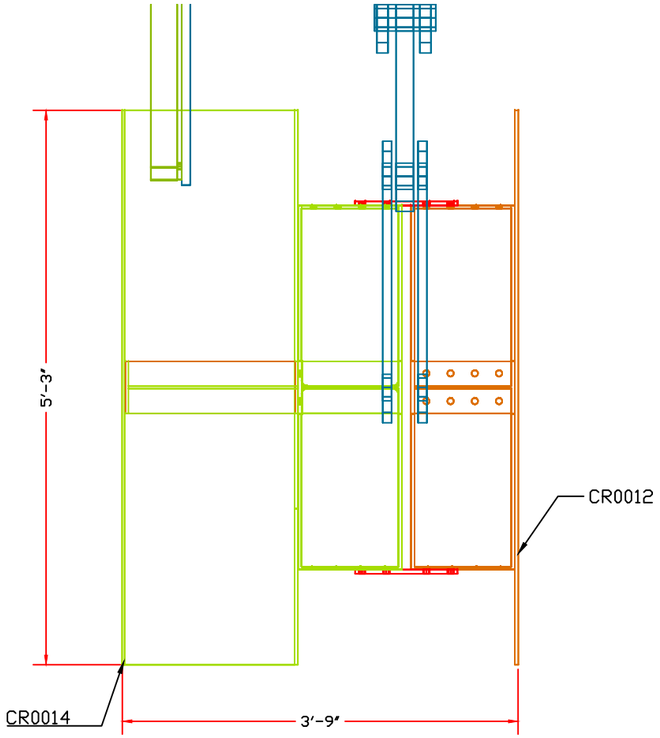
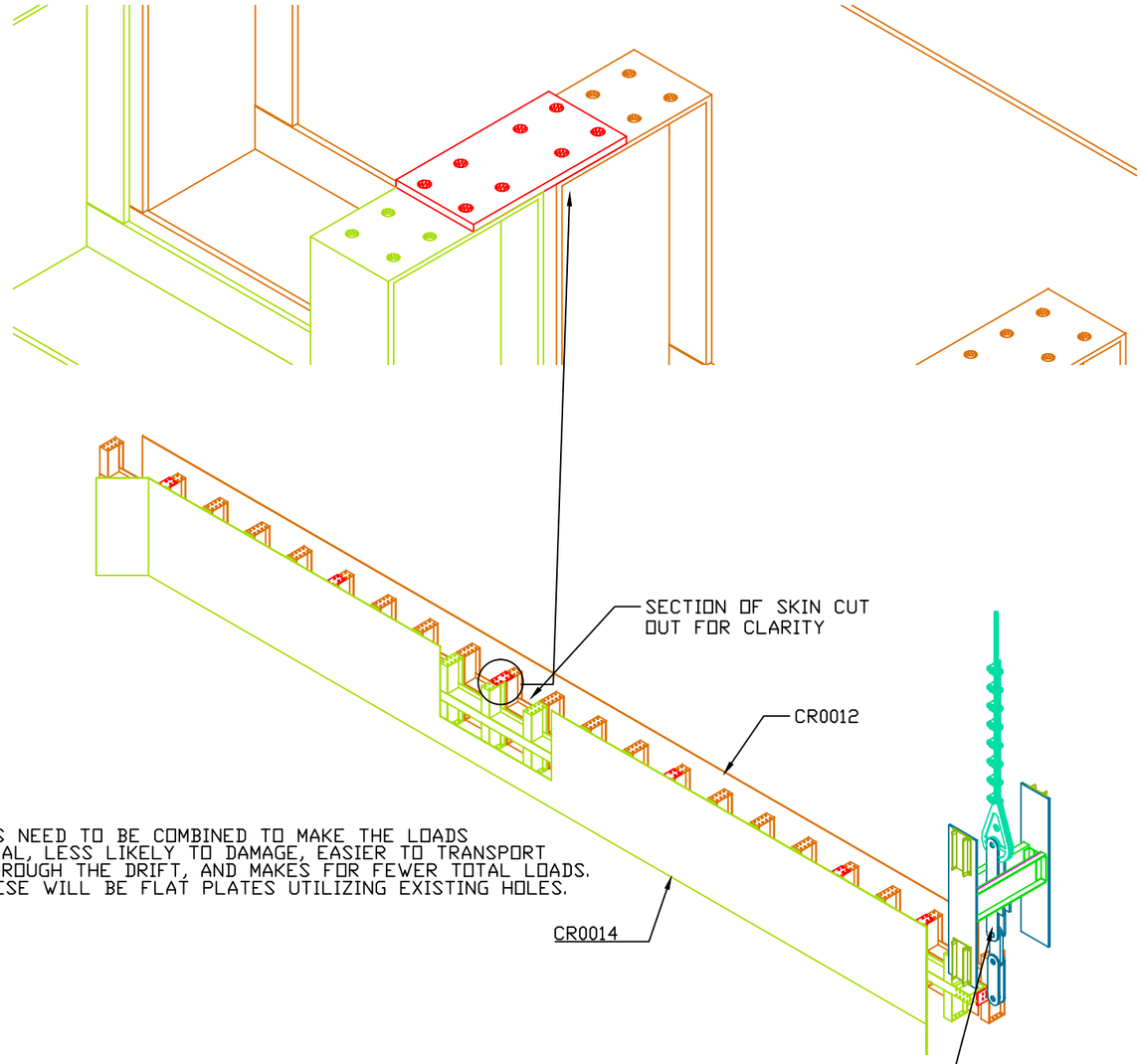
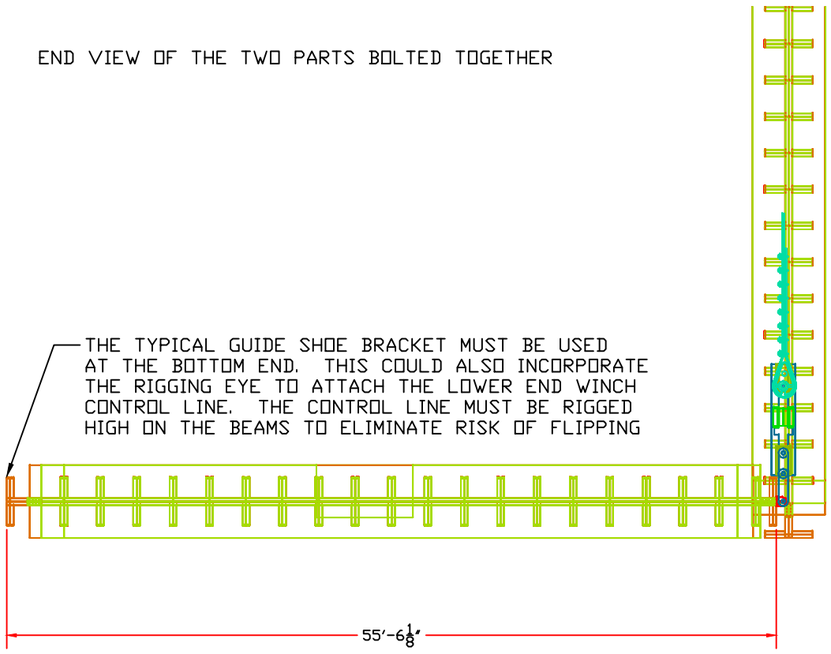
Project Name and Address
LBNF CRYOSTAT STRUCTURE
PLANS AND METHODS TO LOWER BEAMS
CR0004

DWG NO. 12413





END VIEW OF THE TWO PARTS BOLTED TOGETHER



SEVERAL PIECES NEED TO BE COMBINED TO MAKE THE LOADS
MORE SYMMETRICAL, LESS LIKELY TO DAMAGE, EASIER TO TRANSPORT
ON ITS EDGE THROUGH THE DRIFT, AND MAKES FOR FEWER TOTAL LOADS.
MOST OFTEN THESE WILL BE FLAT PLATES UTILIZING EXISTING HOLES.

USE THE STANDARD SKIP COMPARTMENT CROSSHEAD

THERE ARE 34 PCS CR0012, 34 PCS OF CR0013 AND 68 PCS OF CR0014
CR0012 AND CR0013 ARE SAME EXCEPT OPPOSITE HAND CONSTRUCTION
COMBINE 1 PC OF CR0014 WITH 1 PC OF EITHER CR0012 OR CR0013
WT OF CR0012 OR 13 IS 8370 LBS, AND CR0014 IS 8020 LBS
TOTAL COMBINED WT IS 16,390 LBS THERE ARE 34 TRIPS REQUIRED

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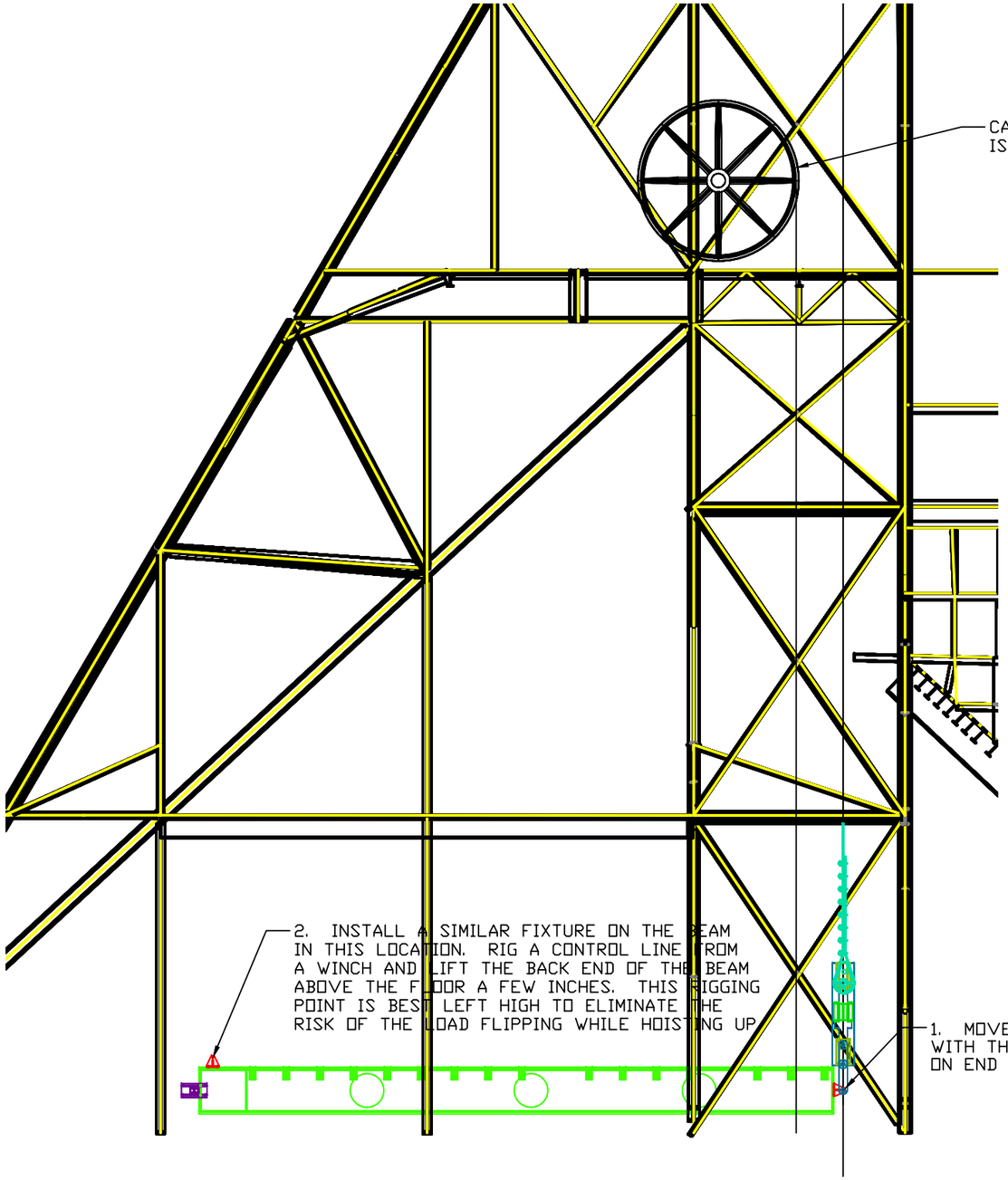

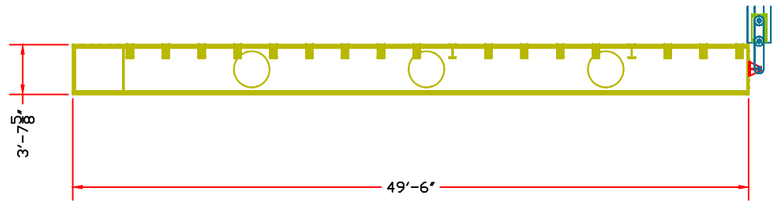

CR0032 DIMENSIONALLY SAME AS CR0030

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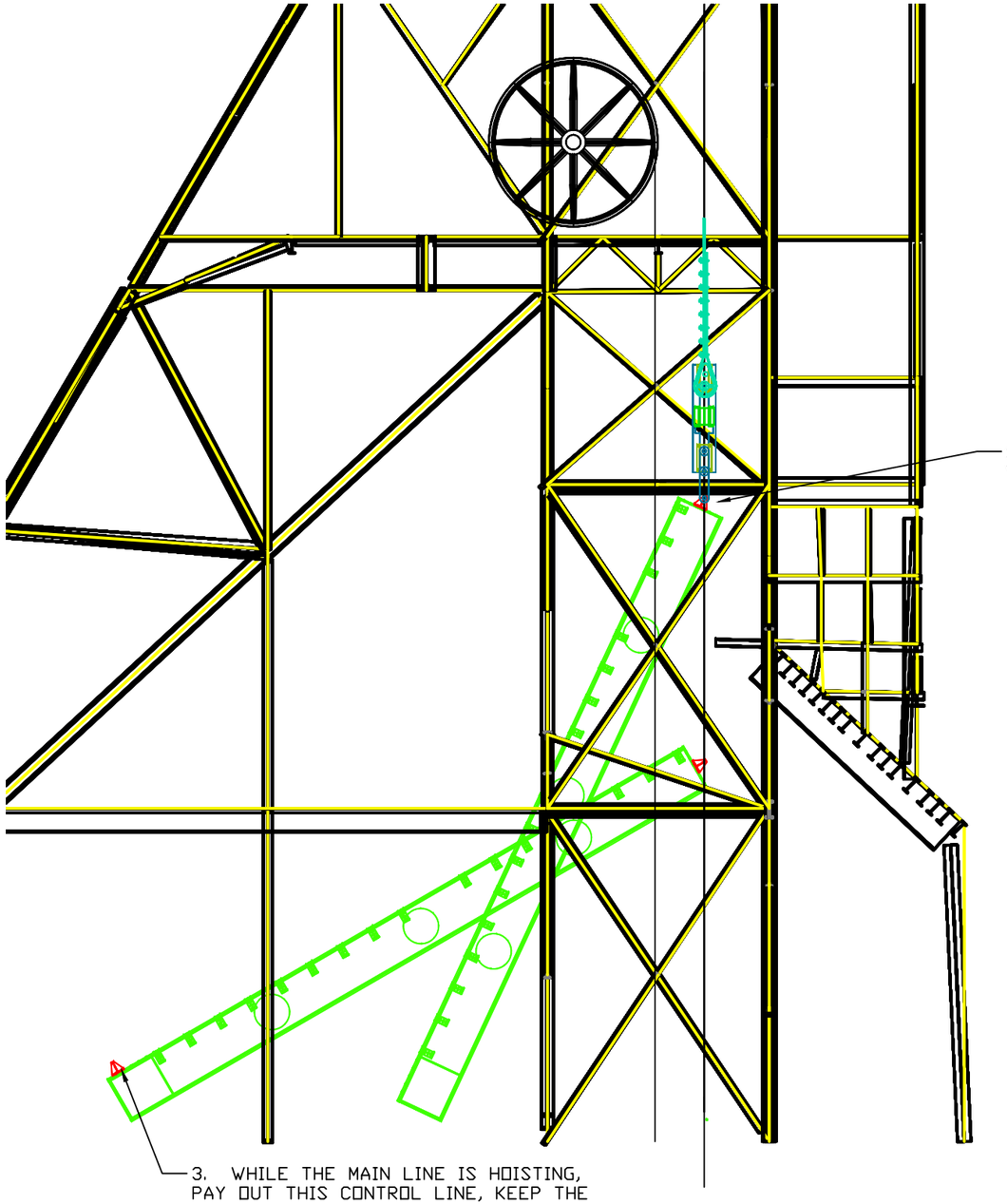

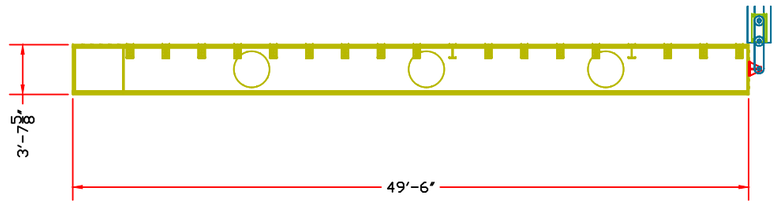

CR0032 DIMENSIONALLY SAME AS CR0030

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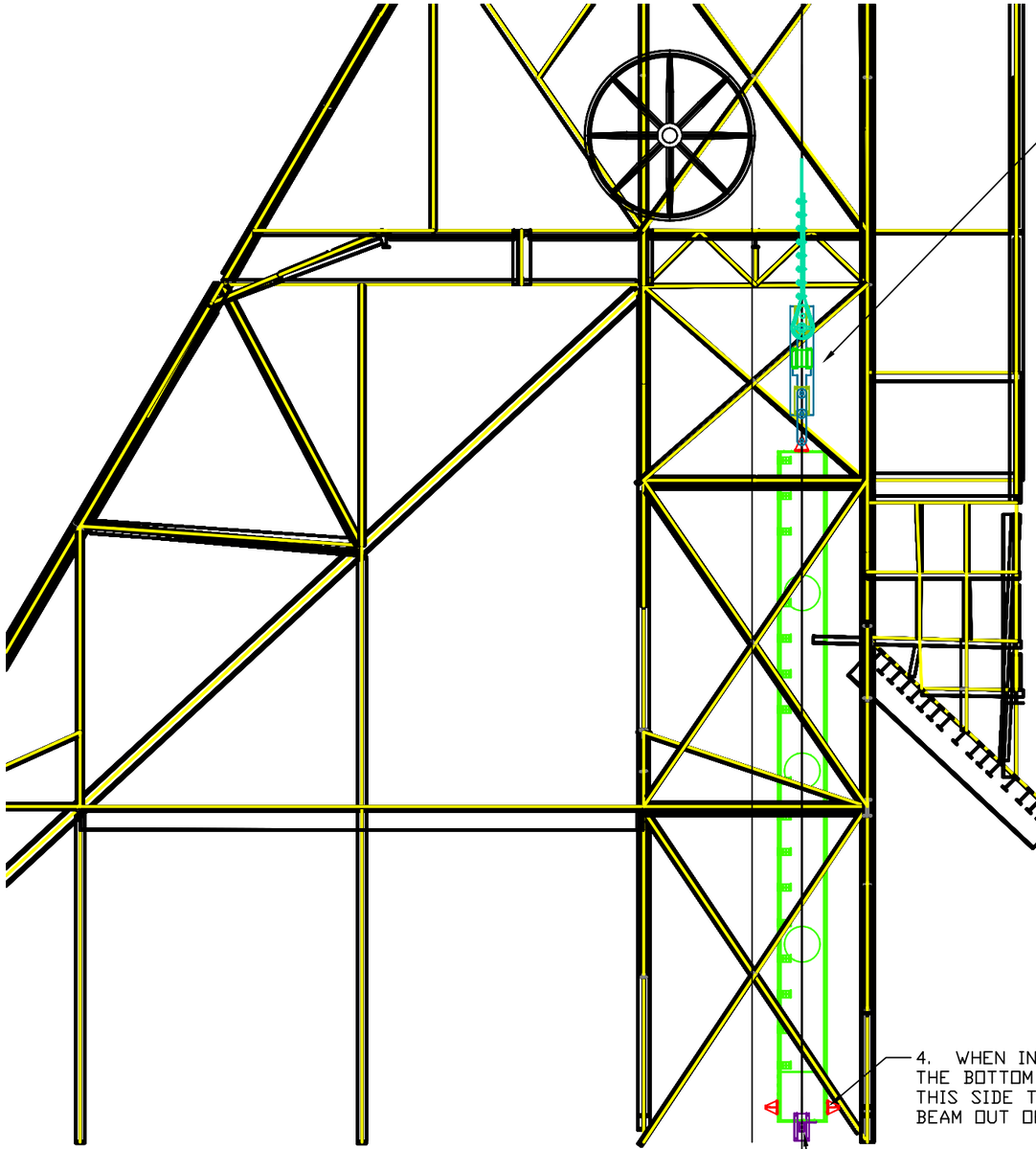
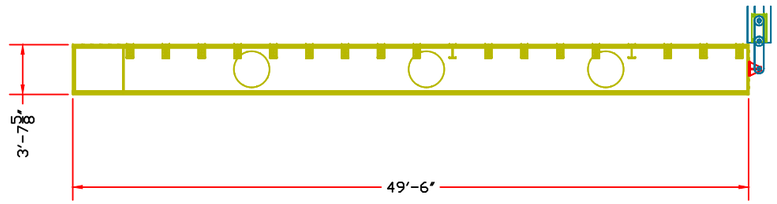


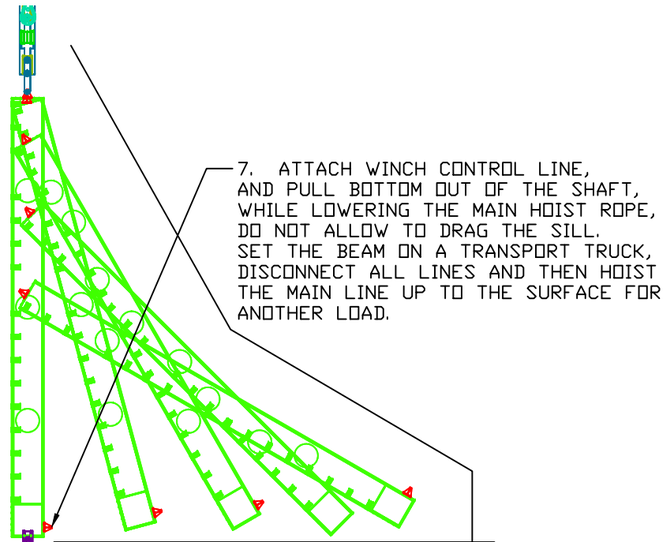
WHEN LIFTED INTO THE VERTICAL POSITION, IT APPEARS THE CROSSHEAD IS SLIGHTLY ABOVE THAT OF A NORMAL SKIP IN THE DUMP POSITION



CR0032 DIMENSIONALLY SAME AS CR0030

4. WHEN IN VERTICAL POSITION, MOVE THE BOTTOM BEAM HOLDBACK FIXTURE TO THIS SIDE TO ASSIST WITH PULLING THE BEAM OUT OF THE SHAFT. MAY NEED NEW HOLES

5. EXTEND THE LOWER GUIDE ASSY ARMS TO ENGAGE THE THE GUIDES AFTER BEAM IS LIFTED IN THE VERTICAL POSITION



7. ATTACH WINCH CONTROL LINE, AND PULL BOTTOM OUT OF THE SHAFT, WHILE LOWERING THE MAIN HOIST ROPE, DO NOT ALLOW TO DRAG THE SILL. SET THE BEAM ON A TRANSPORT TRUCK, DISCONNECT ALL LINES AND THEN HOIST THE MAIN LINE UP TO THE SURFACE FOR ANOTHER LOAD.

6. LOWER GUIDE ASSY ARMS RETRACTED BEFORE BEAM IS DRIFTED OUT FROM THE SHAFT

CR0030 SHOWN AT 4850L

CR0030 SHOWN AT COLLAR
26 PCS, 15,190 LBS EA

CR0032
66 PCS, 15,290 LBS EA

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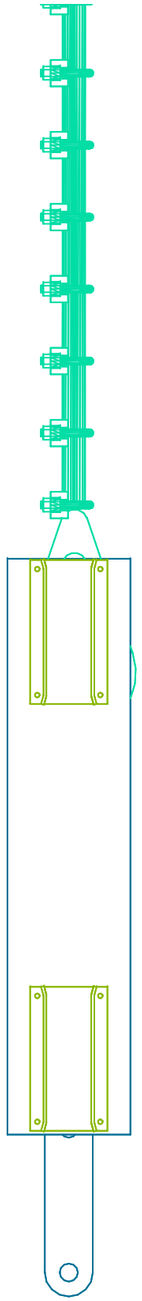

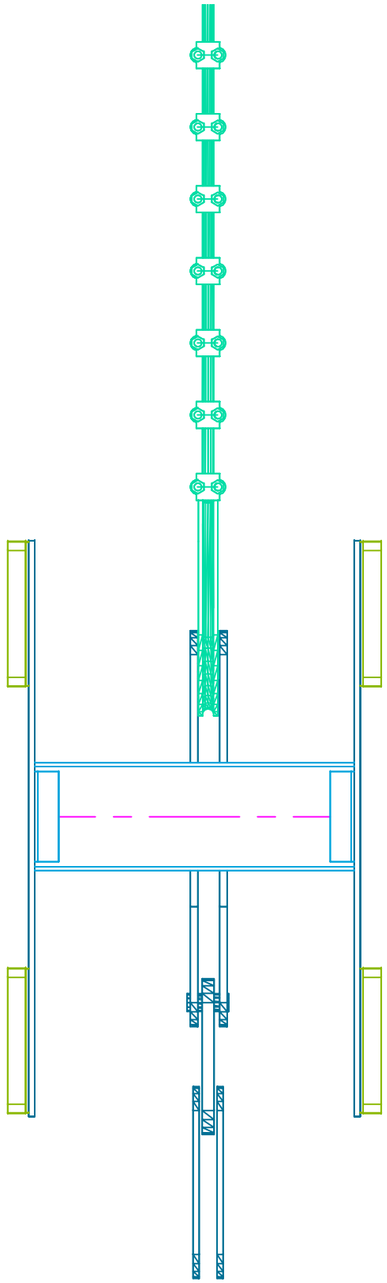

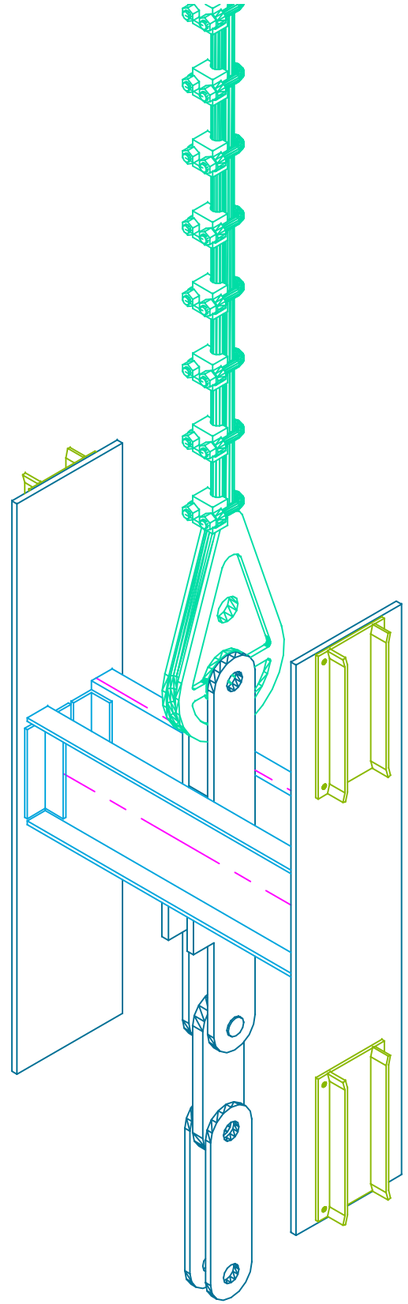

FRONT AND SIDE ELEVATION VIEWS OF PROPOSED DKIP COMPARTMENT CROSSHEAD FOR LOWERING THE LONG LBNF CRYOSTAT BEAMS

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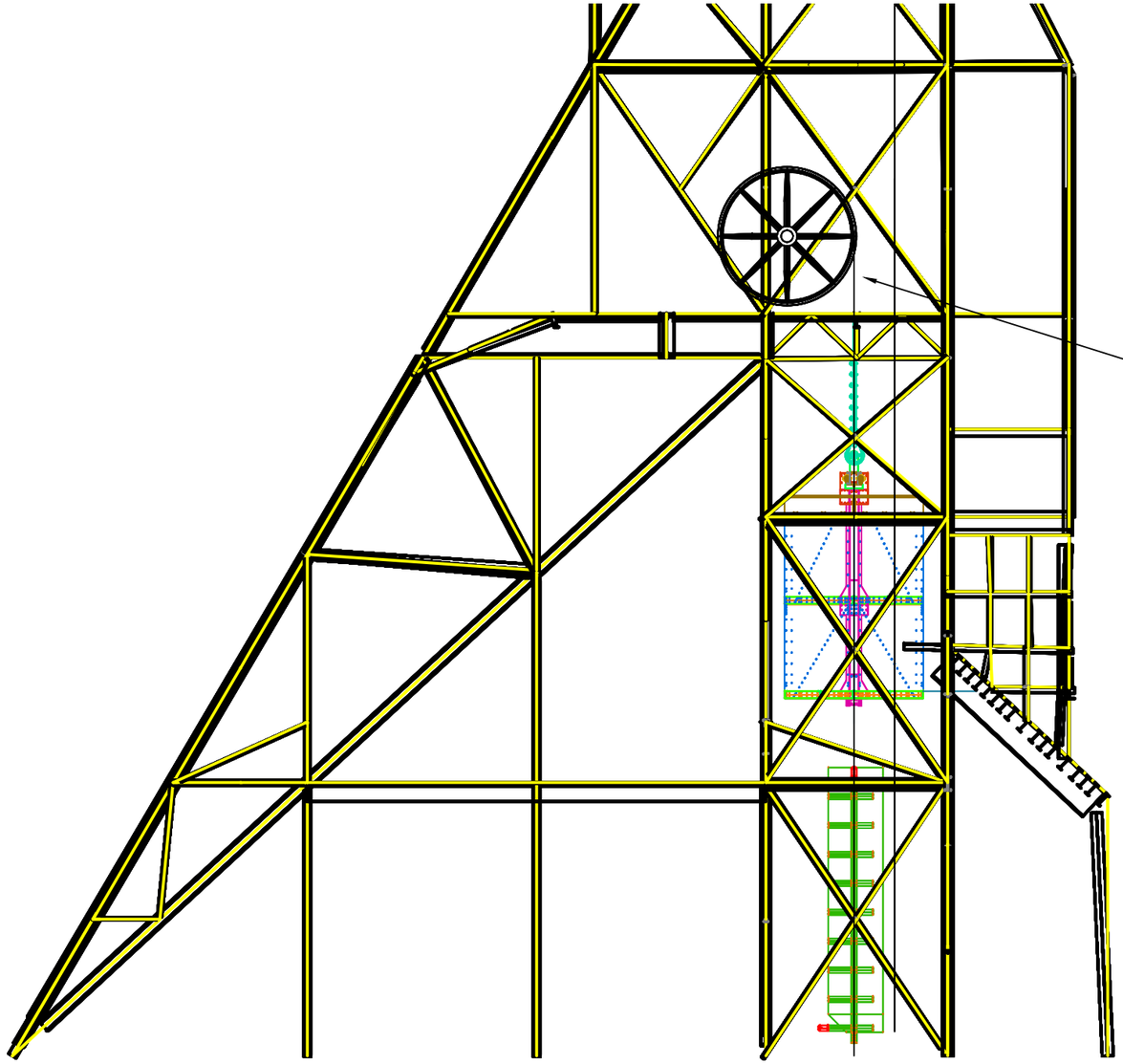

HERE IS THE REASON THESE OVER 22' NEED TO GO DOWN THE YATES
AS CLIP TO SHEAVE CLEARANCE IS VERY TIGHT, ESPECIALLY WITH
A TALLER NEW CAGE, SHOWN IS ORIGINAL DIMENSIONS WITH 7' DECKS

SHOWN IN THE SHAFT IS CR0015 IN THE ROSS CAGE COMPARTMENT
THE CLOSE PROXIMITY OF THE ROPE CLIPS TO THE SHEAVE IS NOT ALLOWABLE
CONSEQUENTLY SECTIONS SIMILAR TO THIS MUST BE TRANSPORTED DOWN THE YATES

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Ross Cage Conveyance Requirements

1. All aluminum construction with target weight not to exceed 9,000 lbs.
2. The top of the cage shall be provided with 4 lifting lugs suitable for lifting with a crane, and the bottom of the cage shall be outfitted with stub legs or other method that the cage can stand vertically and not damage the chair mechanism.
3. Cage to have double decks with middle deck capable of being removable to accommodate tall loads. If a mechanism can be conceived to help deck installation and removal, then this part is to become a part of this request. This device could be constructed from steel.
4. The capacity of each deck being able to carry a single load or combination of loads up to 13,000 lbs.
5. The cage shall also be capable of carrying a slung load from under the cage. The capacity will need to be 13,000 pounds from any one load point. Six lugs will be necessary, one set on the cage centerline with the other two sets 4' from the cage centerline in the east west direction.
6. The middle deck shall have a minimum clearance of 7' below the open door, while the bottom deck shall have a minimum clearance of 10' to an obstruction.
7. Both decks to have chairing mechanisms also equipped with a chair operating switch that is wired into a radio that will alert the hoist operator of chair linkage engagement.
8. Both decks shall have 18" and 30" gage rail installed about the deck centerline.
9. Each deck shall be equipped with a midway load barrier.
10. Both ends on both decks shall have rollback style gates which will need to be removable
11. 4/4 thickness rough pine decking shall be installed on floors to minimize slipping.
12. Both decks shall be equipped with a side entry emergency escape door that will exit out to the south skip compartment.
13. During design and fabrication, strive to keep inside clearances as wide as possible, and to keep the overall height as short as possible.
14. Both decks shall be equipped with SDSTA furnished radios, battery boxes, and a removable lighting system that is powered from its own battery box. These radios are multiple channel leaky feeder devices and SDSTA will provide dimensions for the radio and battery box. Batteries need to be replaced each shift and radios also need replacement from time to time, will need to be easily accessed, and protected from shaft water. All conduits and wire ways shall be constructed from aluminum.
15. The sides of the cage shall be a solid material and not expanded metal.
16. The cage shall be equipped with bonnets that can be opened up to allow for long loads that can stand on the floor of the cage deck. The cage also will need a work deck for shaft inspections, perhaps incorporated into the top of the bonnets. An additional removable bonnet will then be required to protect the work deck personnel. The work deck shall have a minimum of 8 individual tie –off points each rated per the MSHA/OSHA load requirement. During design and fabrication, it shall be imperative to minimize openings through the bonnet that can cause shaft water to leak or drip onto personnel.
17. Guides will consist of a single set of two located on the cage centerline in the north south direction. The new cage will be equipped with spring loaded guide wheel assemblies along with fixed guide shoes placed at the top and bottom of the cage. These devices are to be designed to be easily replaceable.
18. A robust wood guide dogging system shall be designed and installed. Cage guides are Fir.
19. The cage is to be equipped with slack rope switches which will also be wired into the cage radio that will alert the hoist operator of a potential problem.

20. Drawbars to fit the 1 5/8” wire rope thimble termination shall also be included.
21. Pivot pins and linkages for the dog mechanism, chair mechanism, drawbars, and the spring loaded guide rollers shall have wear bushings installed with greasable joints.
22. A full set of replacement spares shall be provided with the cage which will include drawbars, all pins, all fixed guide shoes, guide roller wheels, gates, gate guide rollers, gate track, plus any other items that wear over normal use.
23. If connecting aluminum with ferrous materials, sufficient insulating practices shall be implemented to prevent corrosion.
24. The cage must include an SDSTA witnessed drop test
25. Provide an optional cost to perform a witnessed fall test as per typical Canadian tests.
26. Coating specification for non-aluminum components?
27. Critical materials shall have mill certifications provided along with any NDT test results.
28. Welders shall be certified with documentation sent to the SDSTA.

We will need to send perhaps pictures of how the Yates cage radio and lights are rigged up. Do we have any drawings for the batteries or radios?

Drawings include:

Homestake Ross Cage drawings 6767-77 Sheets 1-19, Updated gate drawing 10215-91, 18 & 30 Ga track typical in Yates 7411-111.