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DOCUMENTATION PAGE

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SUMMARY This report discusses the objective, criteria, and design of a platform/walkway for the ice tank carriage test frame. For safety reasons, the platform was designed to allow access from one side of the test frame to the other. Additional considerations were cost, weight, ease of use/adjustment, and the ability to fit a wide range of test frame configurations. Furthermore, an additional working platform was added to assist in work with certain models.				
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Technology

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océaniques

ICE TANK CARRIAGE PLATFORM

SR-2006-23

Grant Parr

August 2006

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1.0– Introduction

This project is a response to safety issues raised concerning the ice tank carriage test frame. The test frame is an area that workers must frequently occupy during model setup and testing. Moving from one test frame beam to the other can be hazardous and often involves climbing or jumping in an unsafe fashion. In fact, there was an incident in which an employee was injured while attempting to move from one side to the other.

In order to address this concern, a platform or walkway was proposed to make getting from one side of the test frame to the other easier and safer. The walkway was required to be inexpensive, light, easily adjustable or removable without tools, and able to fit to the majority of test frame configurations.

Additionally, a second platform was designed to allow workers easier access to certain low lying models by providing a working area closer to the surface of the water.

2.0– Design

Several concepts were considered for the platform. These included a telescoping platform, a platform with handrails, and several clamping systems.

The inclusion of a telescoping platform would have eliminated overhang, which could potentially interfere with other operations when the test frame is closed or the gap is small. It would also be able to extend when the test frame was opened or the gap is large. The disadvantage of this system was the fact that it is heavier, more expensive, and would require the custom fabrication of the main telescoping mechanism. In the end, it was most economical to purchase a standard industrial scaffolding platform and adapt it to our needs. Such a platform would cost \$180 and is available from a number of sources including United Rentals. The scaffold itself would only require to be cut to length of 8 feet, and have a series of holes drilled to fit the stops and clamps.

The addition of handrails would greatly increase the safety aspect of the platform. However, the handrails themselves were difficult to adapt to fit both the standard test frame width with the tow post installed and the larger width necessary to install the planar motion machine (PMM). Additional weight and expense were also a downside. Furthermore, safety could have been an issue were someone to lean heavily on the rails and the inclusion of rails would have required a much more elaborate clamping system to meet this concern. Moreover, the addition of

handrails to the scaffolding would have required additional structural parts and gussets in order to counteract a moment created by someone leaning heavily onto the rail. This was seen as a needless complication given the fact that in order to reach platform, you would first have to traverse an area that had no hand rail to begin with, thus making the rail rather redundant. Figure 1 shows the final design of the platforms without the handrail.

In order for the platform to be easily installed, uninstalled, or moved as the particular project might require quick release clamps were chosen. DE-STA-CO clamps model 213-U were chosen. These clamps have a clamping force of 150 lbs and can open wide enough to allow the easy removal of the platform. The clamps simply provide a friction force to prevent the platform from moving up or down the rail to which it is held by a series of aluminum stops. The stops are detailed in Appendix A. Figure 2 shows the clamp, rail, and stop layout.

The lower platform has the same stops bolted to it as the upper platform, but does not have the clamps. The lower platform is held in place by a ladder structure that is detailed in Appendix A. The ladder is hung from the lightening holes of the test frame at any of a number of positions as needed. The hooks are welded to the ladder and simply hung with the hooks inside the lightening holes. Figure 3 shows how the hooks, ladder, and test frame interact.

3.0– Components

The required components for the platforms:

2 DE-STA-CO Model 213-U quick release clamps

8 fabricated aluminium stops as detailed in Appendix A

2 fabricated aluminium ladders with hooks as detailed in Appendix A

2 10 foot scaffolding platforms

32 8-32 socket head cap screws

8 8-32 hex nuts

8 ¼" OD washers

4.0– Conclusion

This document has presented the objective, criteria, and design of the platform for the ice tank carriage platform. A component list is included, as well as drawings detailing the necessary fabricated components. Section 5.0 shows several figures to demonstrate the layout of the design.

5.0– Figures

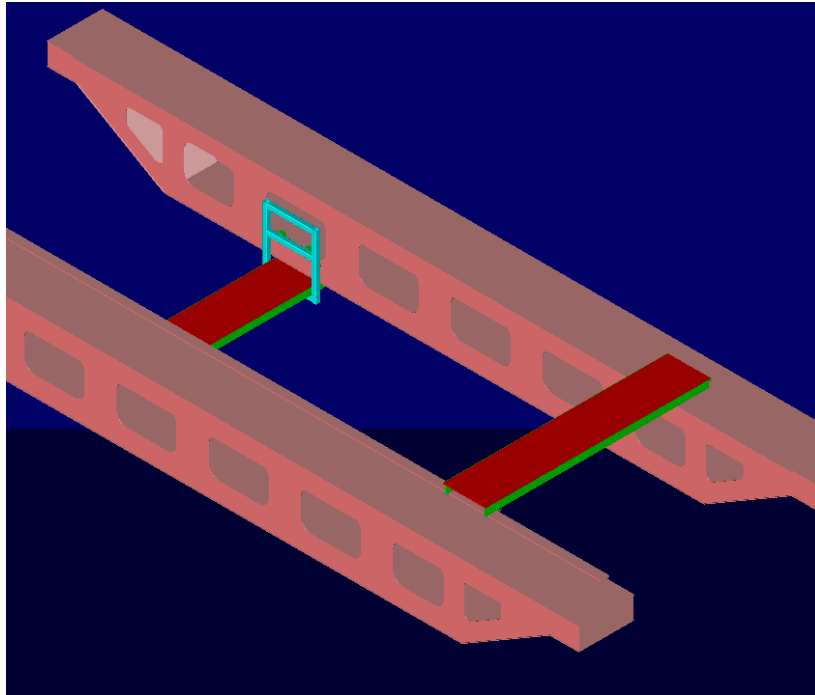


Figure 1: Test Frame with Platform and Lower Platform

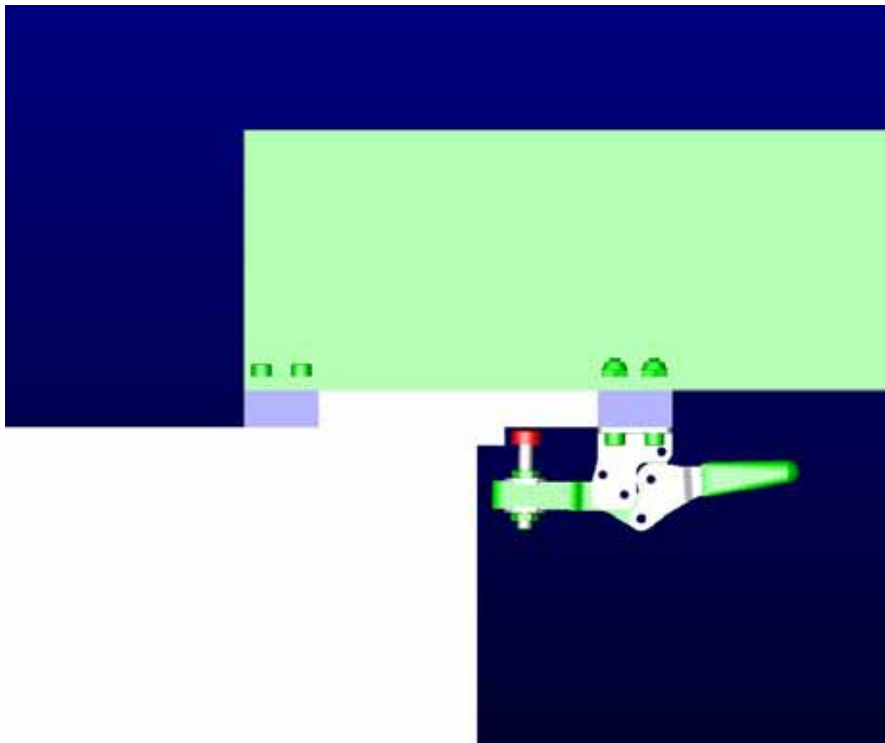


Figure 2: Clamp, Rail (white), and Stops (blue)

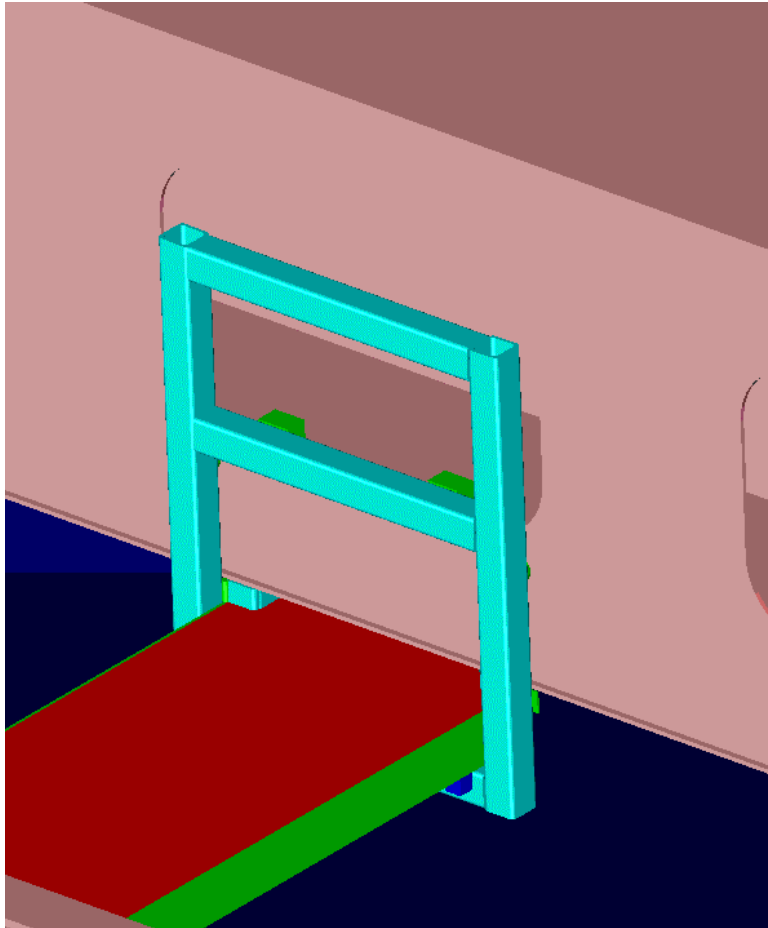
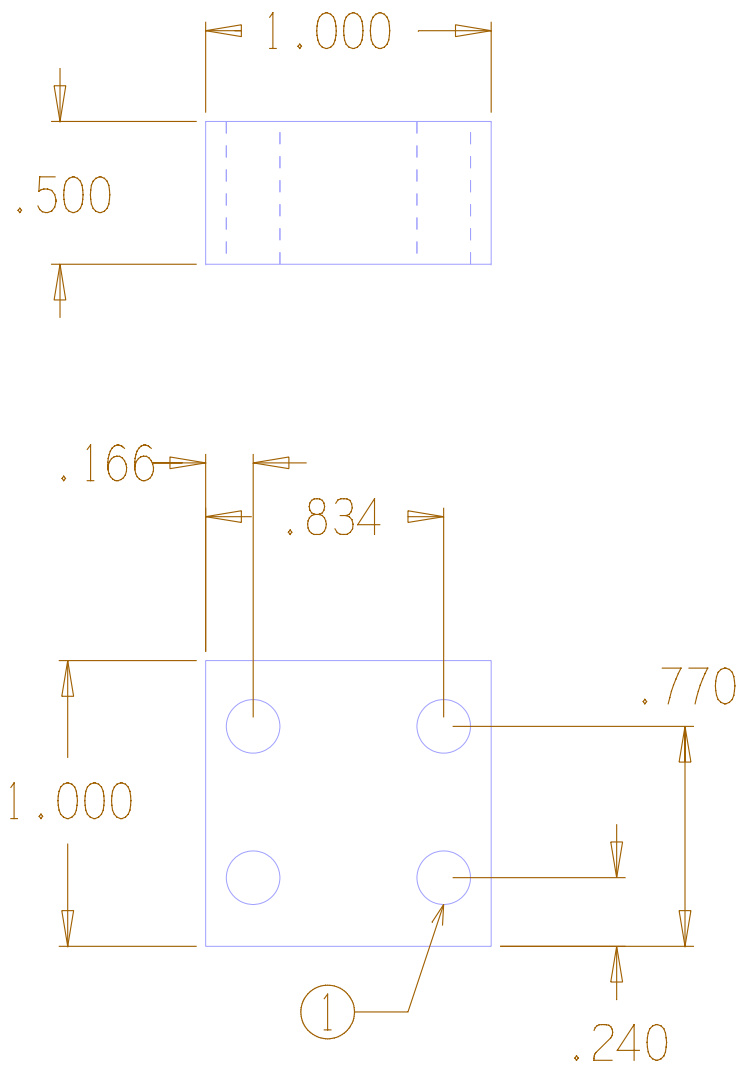


Figure 3: Ladder and Lower Platform

6.0– Appendices



REV		DESCRIPTION	DATE	APPROVED

Notes:
1 DRILLED AND TAPPED 8-32 UNC FOR QUANTITY 6
DRILLED 0.175" FOR QUANTITY 2

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Institute for Marine Dynamics

Kerwin Place, P.O. Box 12093, Postal Station A
St. John's, Newfoundland A1B 3T5

TOLERANCES
(unless specified)
0.X ± 0.03
0.XX ± 0.015
0.XXX ± 0.005
Angle +/- .5 deg.
Fabrication +/- .04
Fraction < 8 inch +/- 1/64
> 8 inch +/- 1/32

Material
6061-T6 Al
Heat Treatment

FORM
XXX

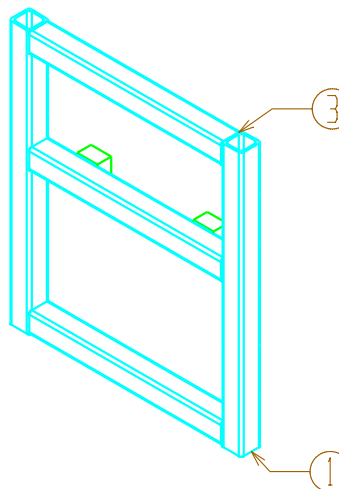
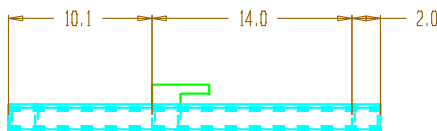
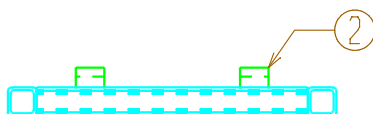
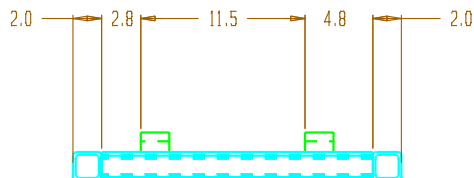
DESIGNED BY G. Parr
CHECKED BY []
APPROVED []

Quantity 1

SCALE 1 : 10
DATE 19-Jun-2005
REV 1 of 1

Platform Stops

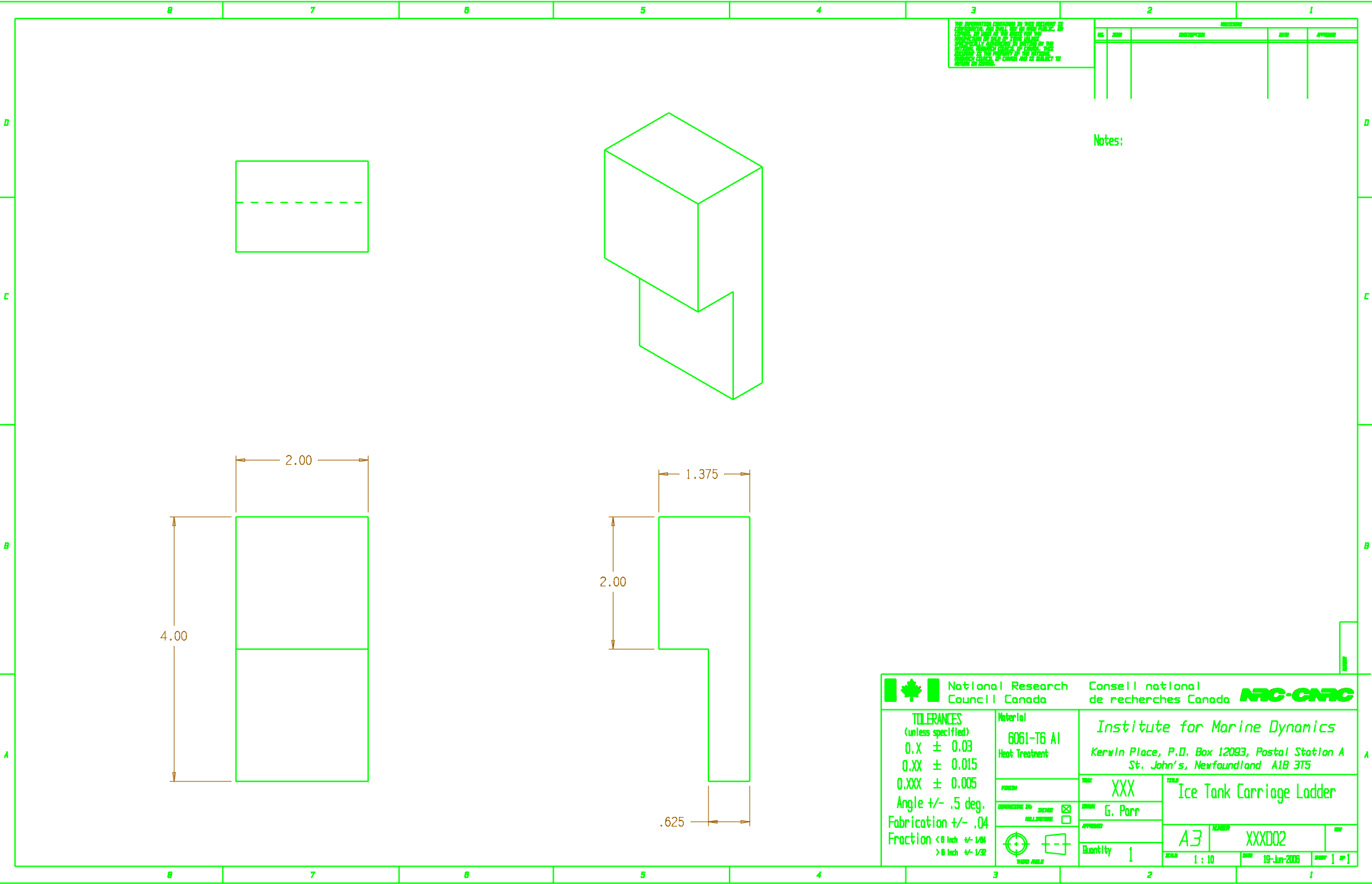
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Notes:

- 1 2" SQUARE TUBES
0.188" WALL THICKNESS
- 2 SEE XXXD02 FOR DETAIL
- 3 ALL JOINTS TO BE WELDED

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TOLERANCES (unless specified) 0.X ± 0.03 0.XX ± 0.015 0.XXX ± 0.005 Angle +/- .5 deg. Fabrication +/- .04 Fraction < 8 inch +/- 1/64 > 8 inch +/- 1/32		Material 6061-T6 Al Heat Treatment		Institute for Marine Dynamics Kerwin Place, P.O. Box 12093, Postal Station A St. John's, Newfoundland A1B 3T5	
FORN		XXX		Ice Tank Carriage Ladder	
DESIGNED BY: XXXXX CHECKED BY: XXXXX		G. Parr		A3	
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Material
6061-T6 Al
Heat Treatment

FORM
XXX

DESIGNED BY ☒ **DESIGNED** ☐
DRAWING ☐

THIRD ANGLE ☒

Quantity
1

SCALE
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19-Jun-2005

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Quantity
1

SCALE
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