

# Application Of Water-based Hydraulic Systems On Dredges

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**Presentation for:**

*WEDA XXXIII Technical Conference & TAMU 44*

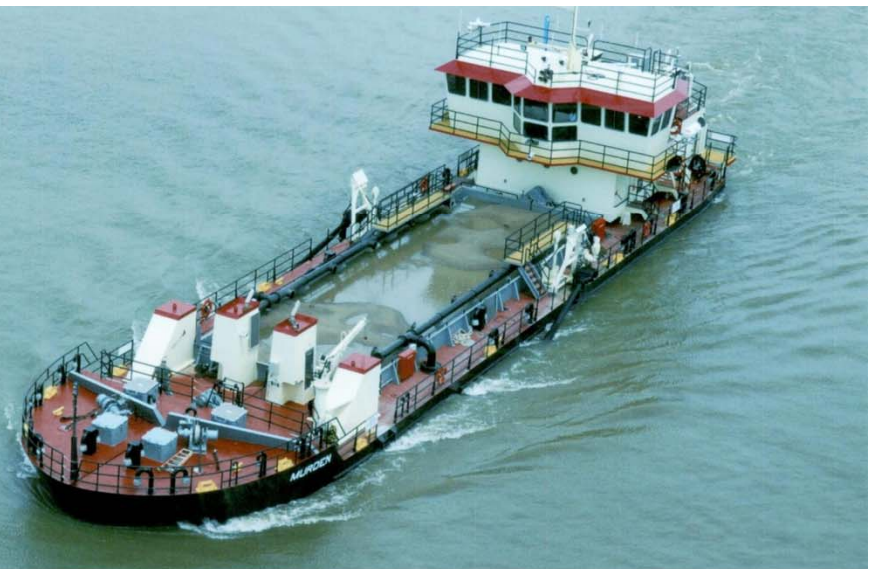
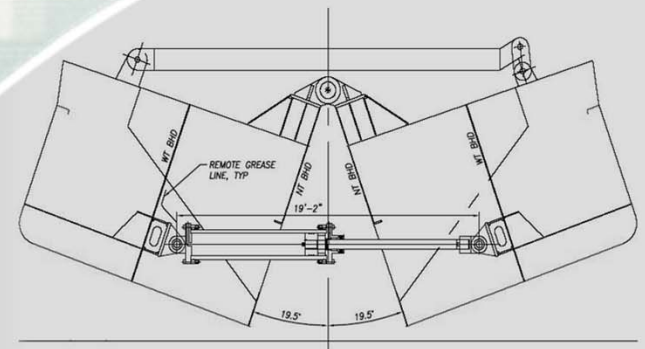
*Dredging Seminar*

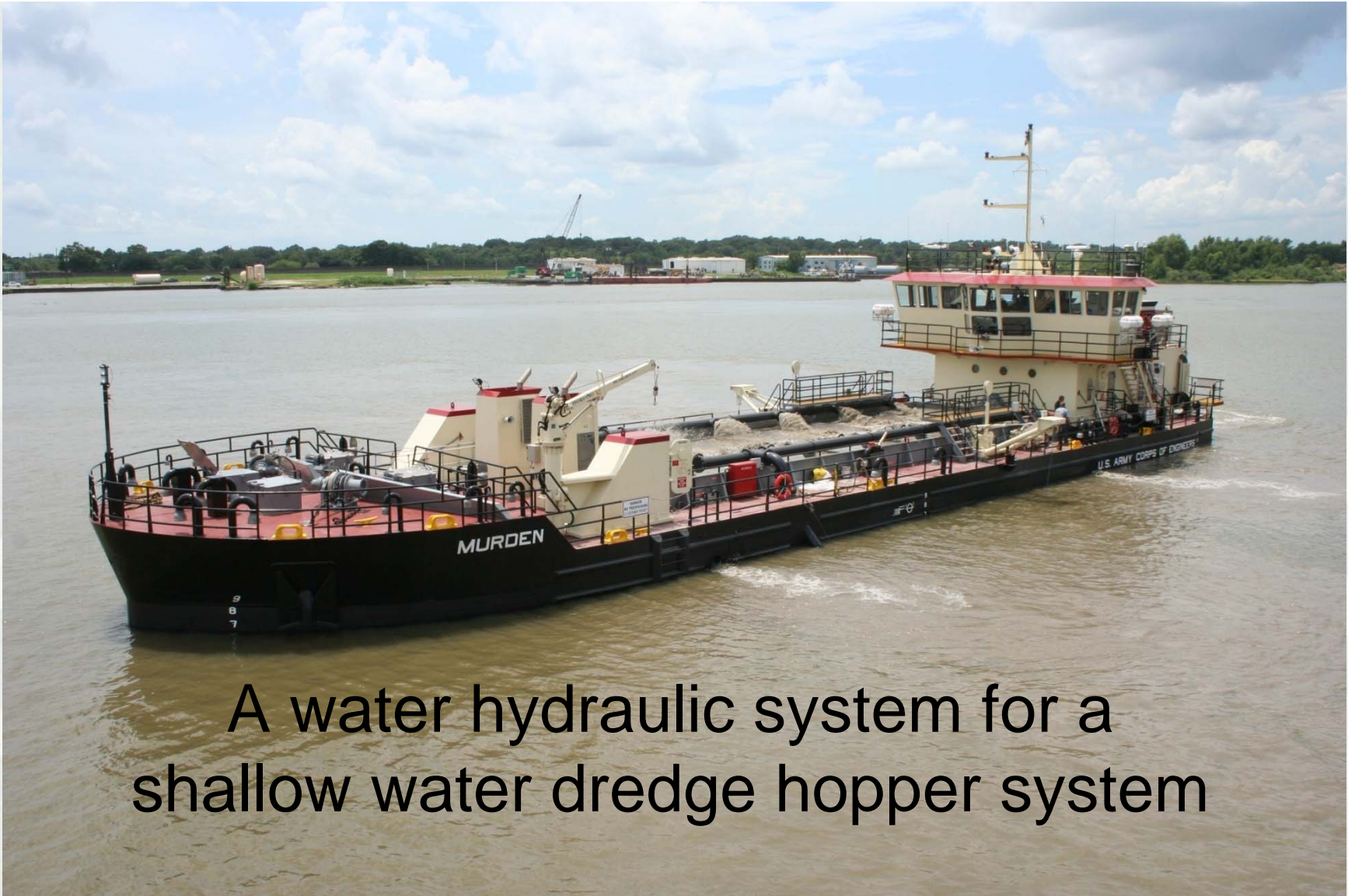
Honolulu, HI

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US Army Corps of Engineers  
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# A water hydraulic system for a shallow water dredge hopper system



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# Application of Water-based Hydraulics on Dredges - Outline

- Key hydraulic components
- Controls
- Materials of construction
- Cost of the system
- Lessons Learned



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# Dredge MURDEN Split-Hull Hopper

First All Water Hydraulics  
Hopper System

Environmentally Safe  
Operation



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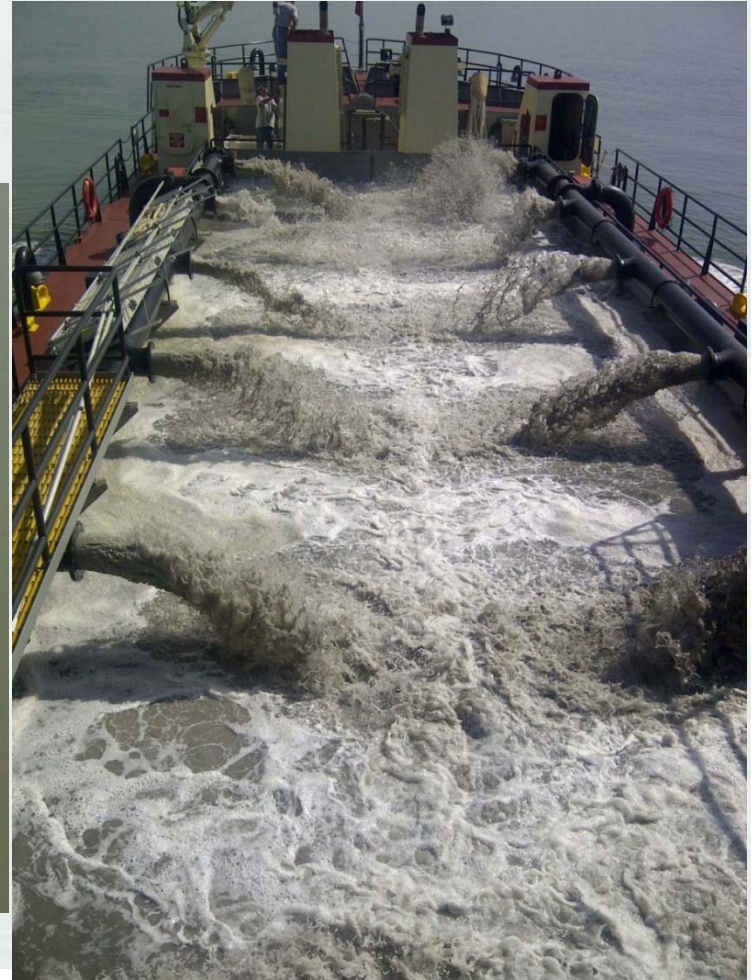
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# Filling the Hopper

View  
[Video](#)



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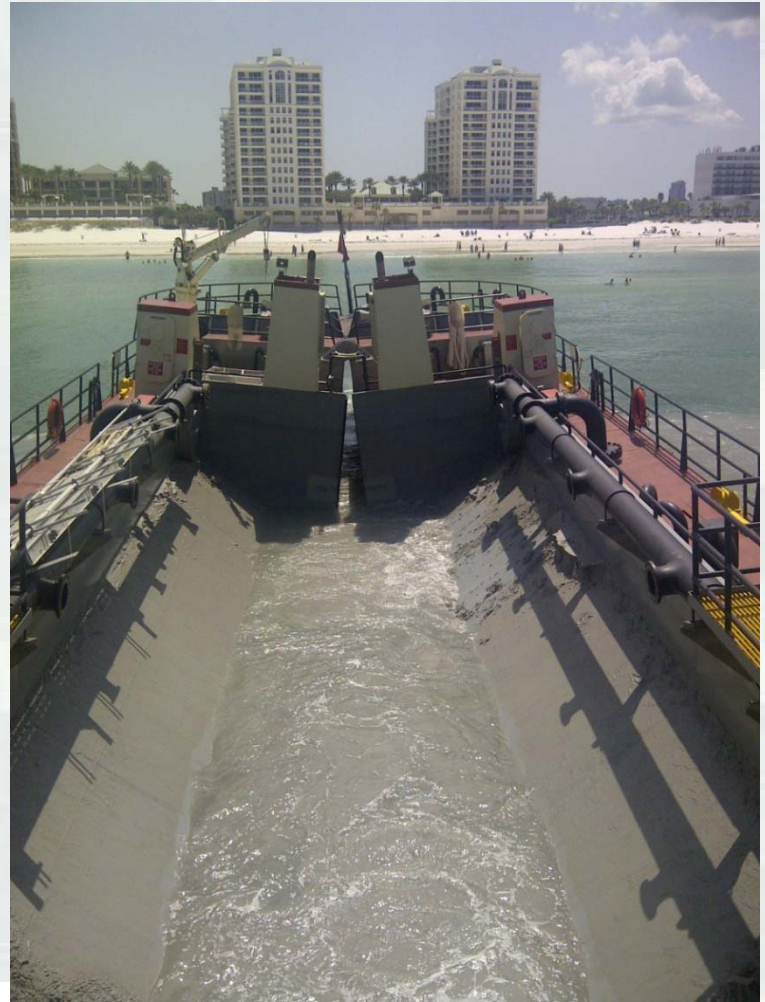
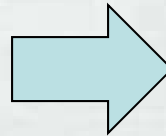


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# Emptying the Hopper



View  
[Video](#)



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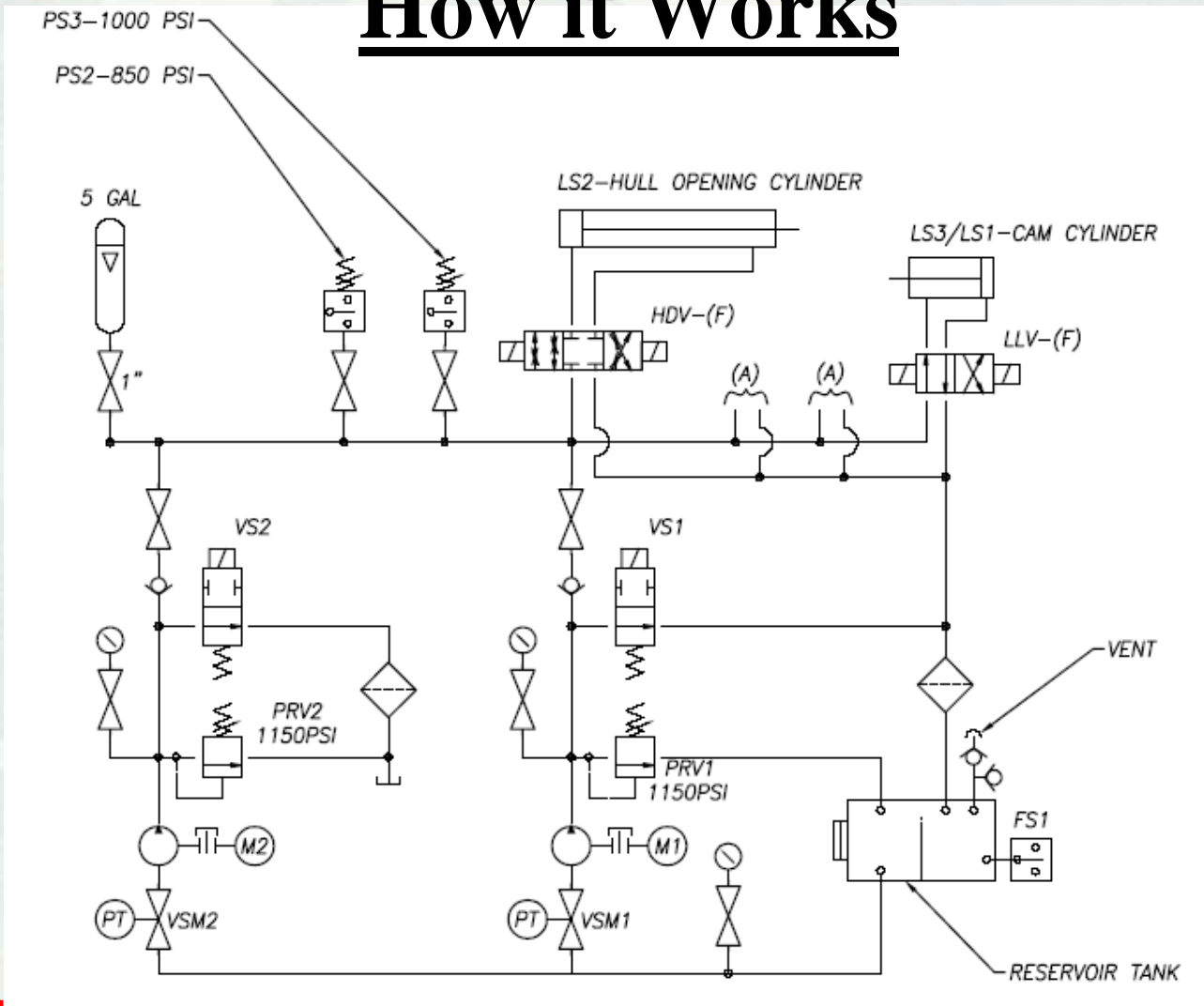


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# How it Works



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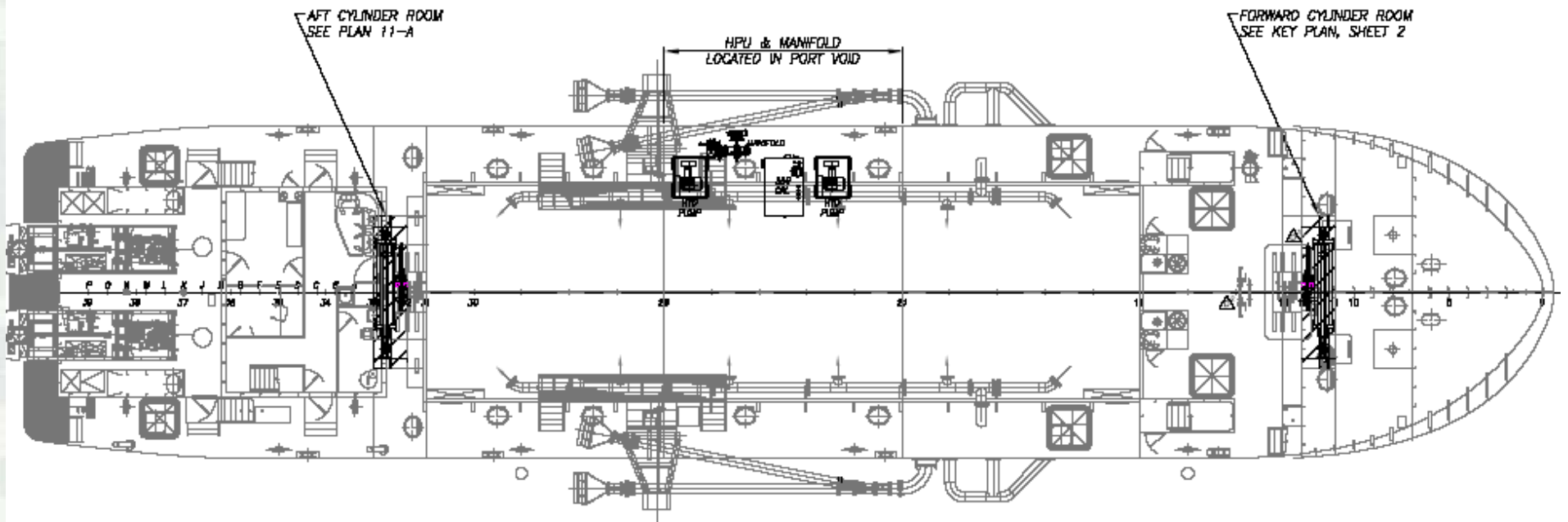


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# Fore and Aft Hull Cylinders and Latches



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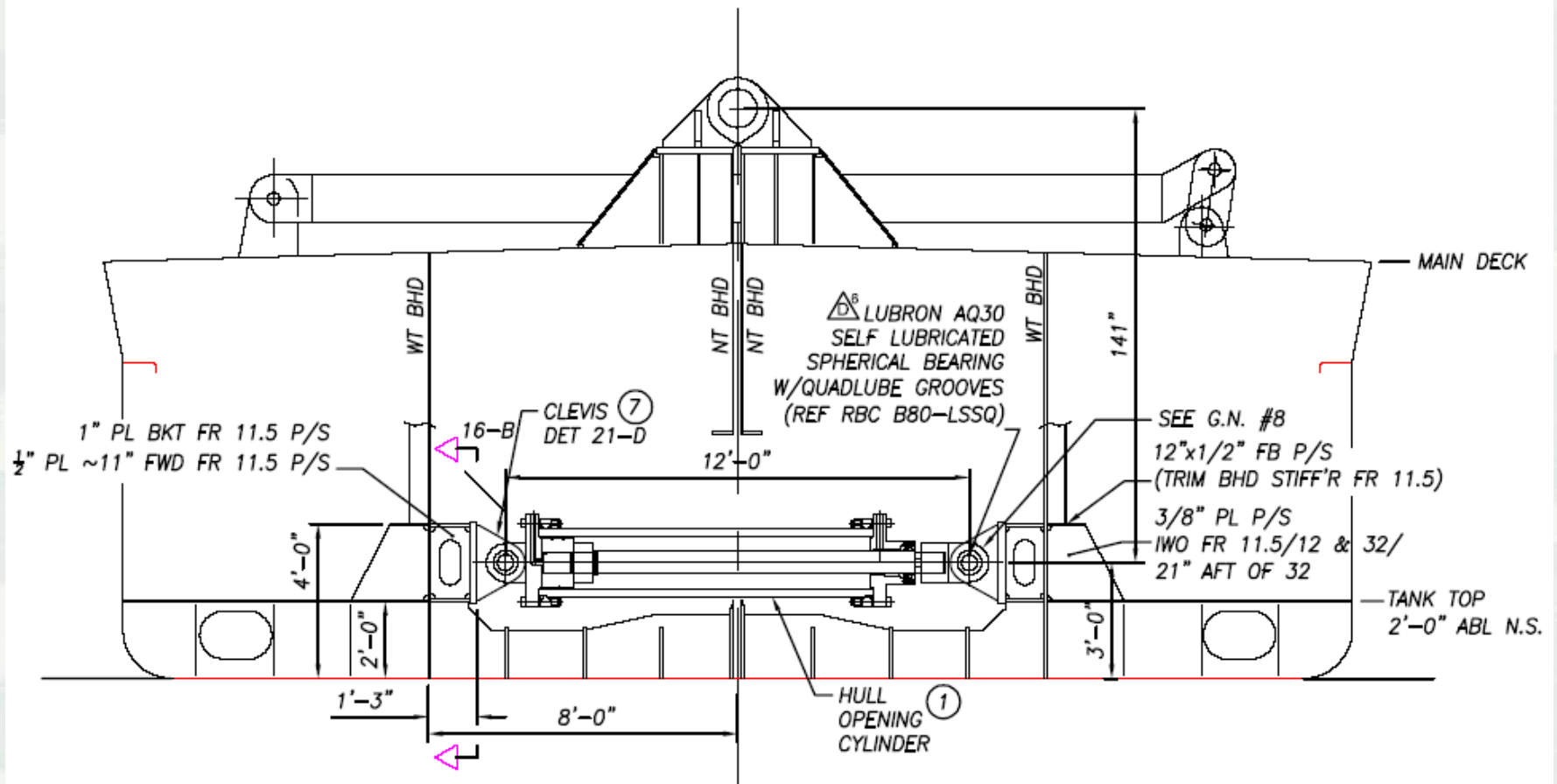
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# Hull Cylinders - Closed



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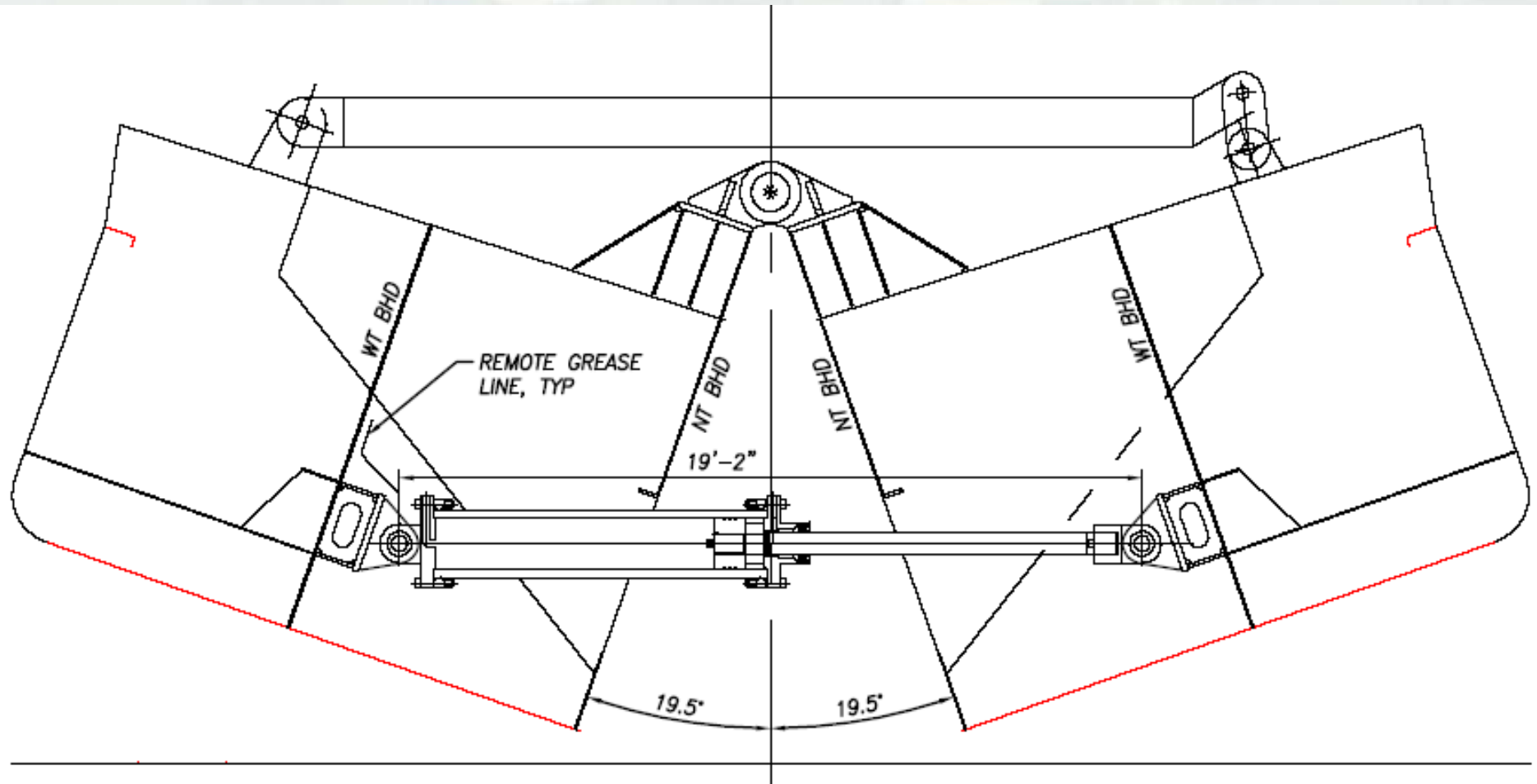


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# Hull Cylinders - Open



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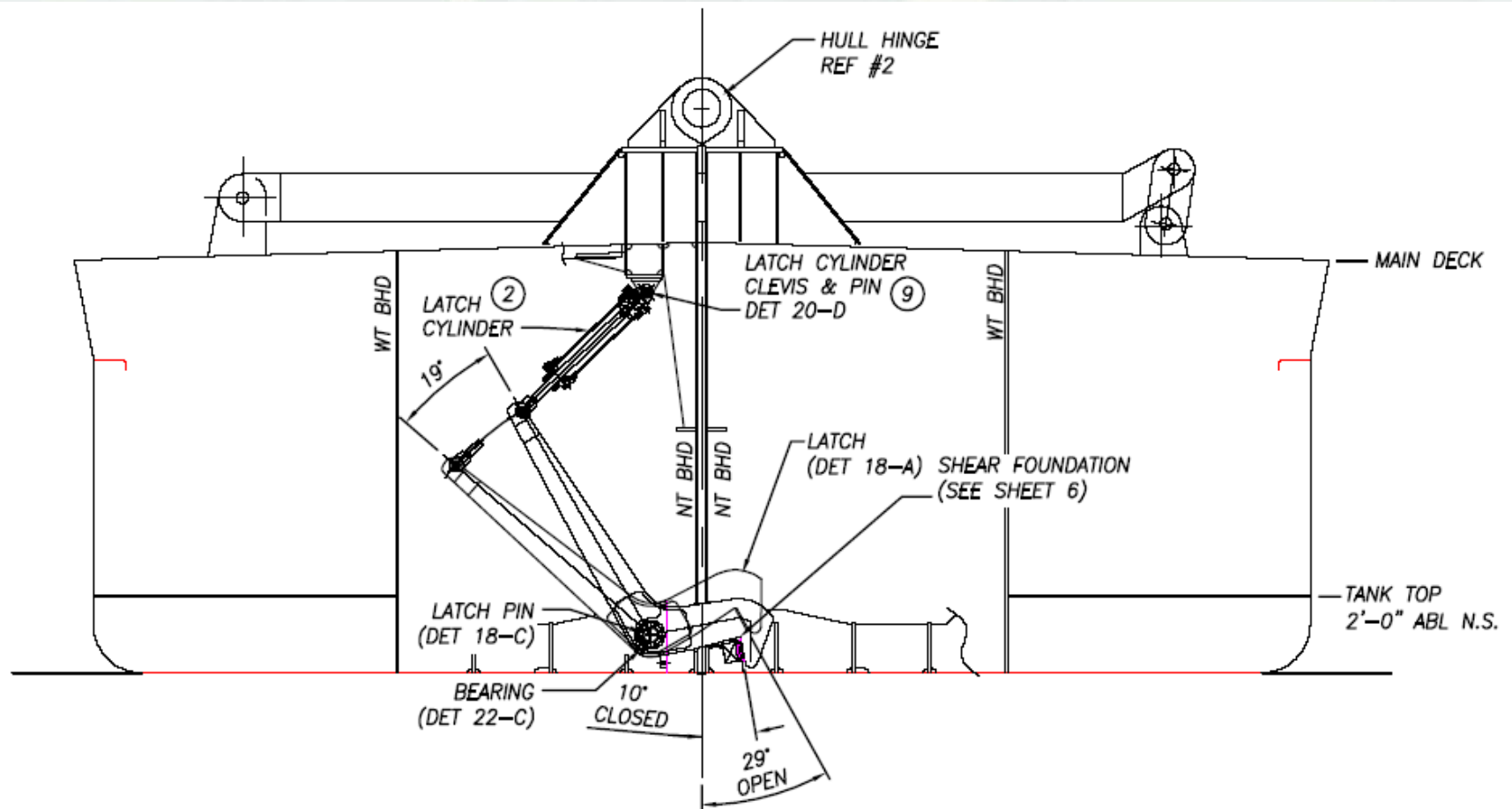


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# Latch Cylinders - Closed



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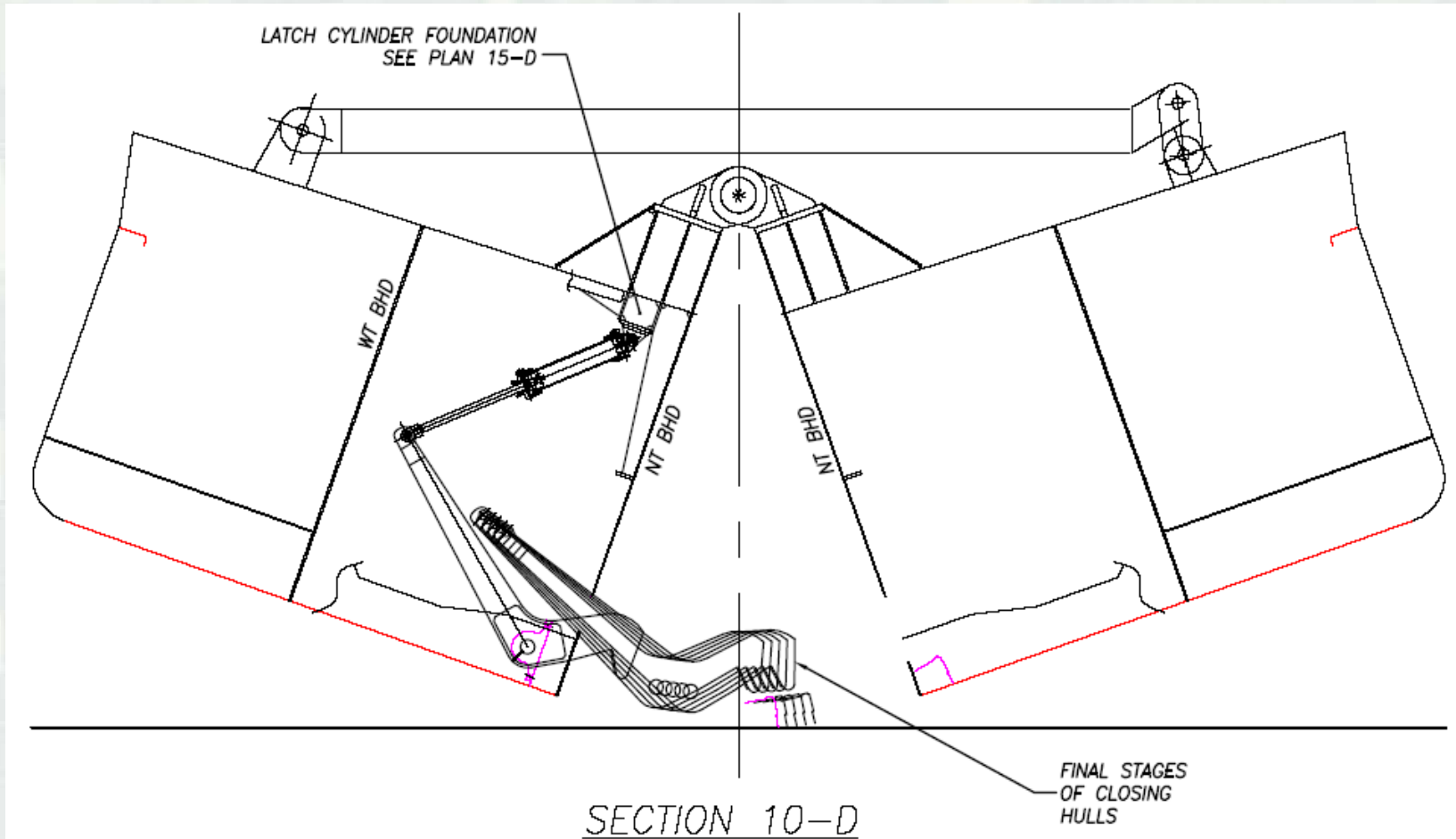


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# Latch Cylinders - Open



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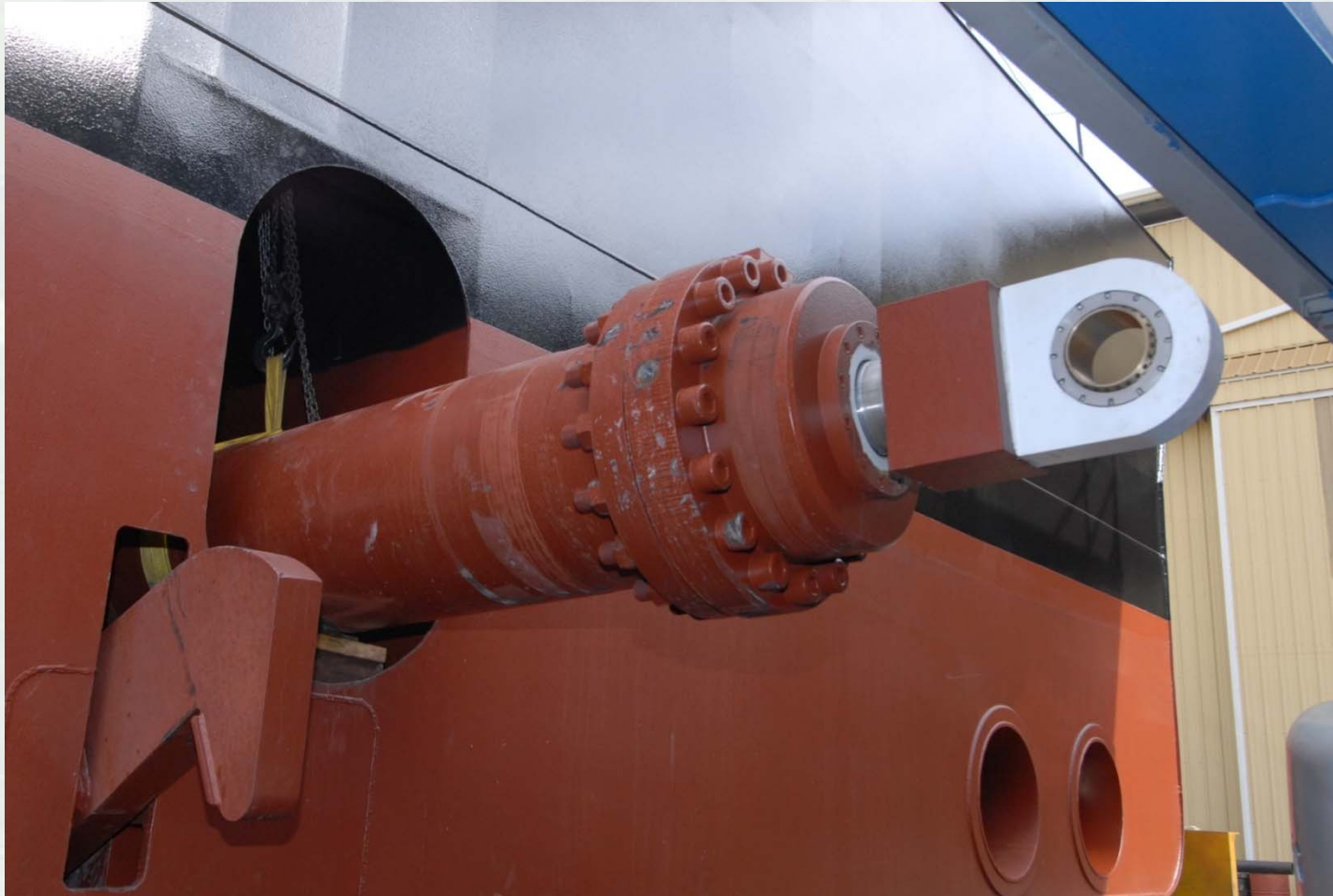


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# Hull Cylinder



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# Hull Cylinder

- 406 mm (16 in) bore
- 178 mm (7 in) diameter rod
- 2184 mm (86 in) stroke.



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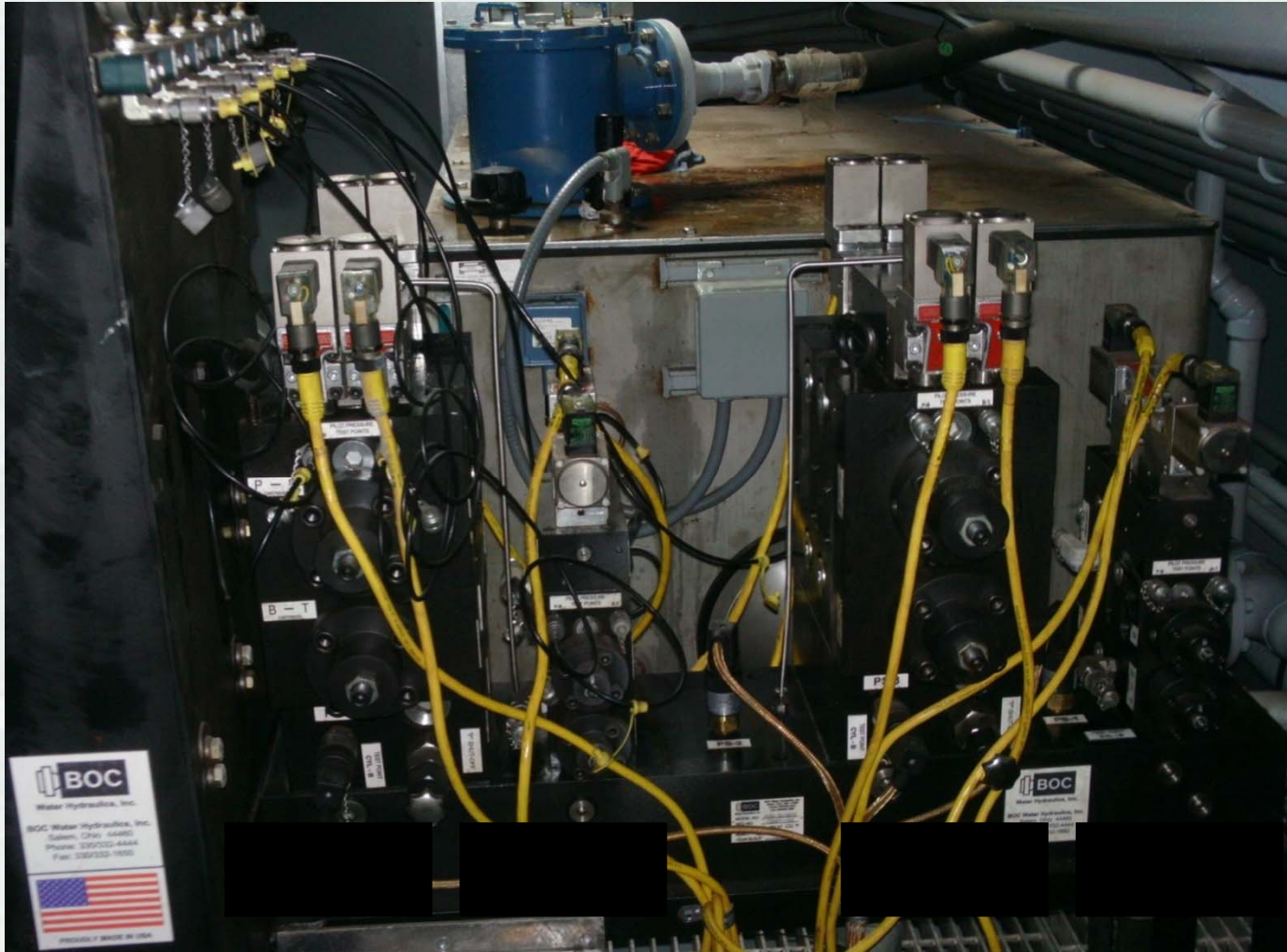


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# BOC Quad-S Cartridge Valves & Reservoir



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# Triplex Plunger Pumps



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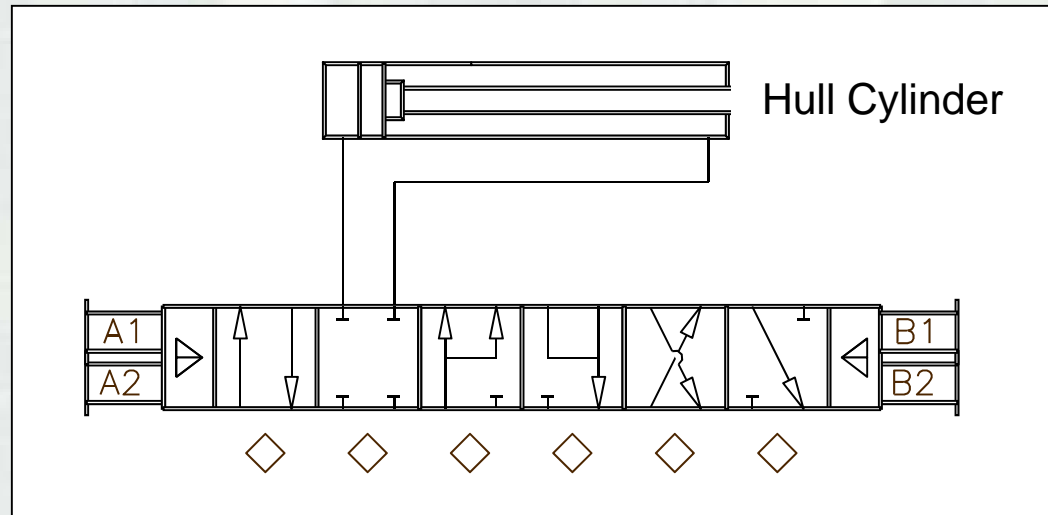
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# Multi-Position Hull Control Valve



Position	Function	Notes
1	Hull Open	Standard Open
2	Hull Stop	
3	Hull Initial Open	To Equalize Press - Load Opens Hull
4	Cylinder "Float"	Emergency Use Only
5	Hull Close	Standard Close
6	Hydraulic Latch	High Press. Applied Downstream on B Port



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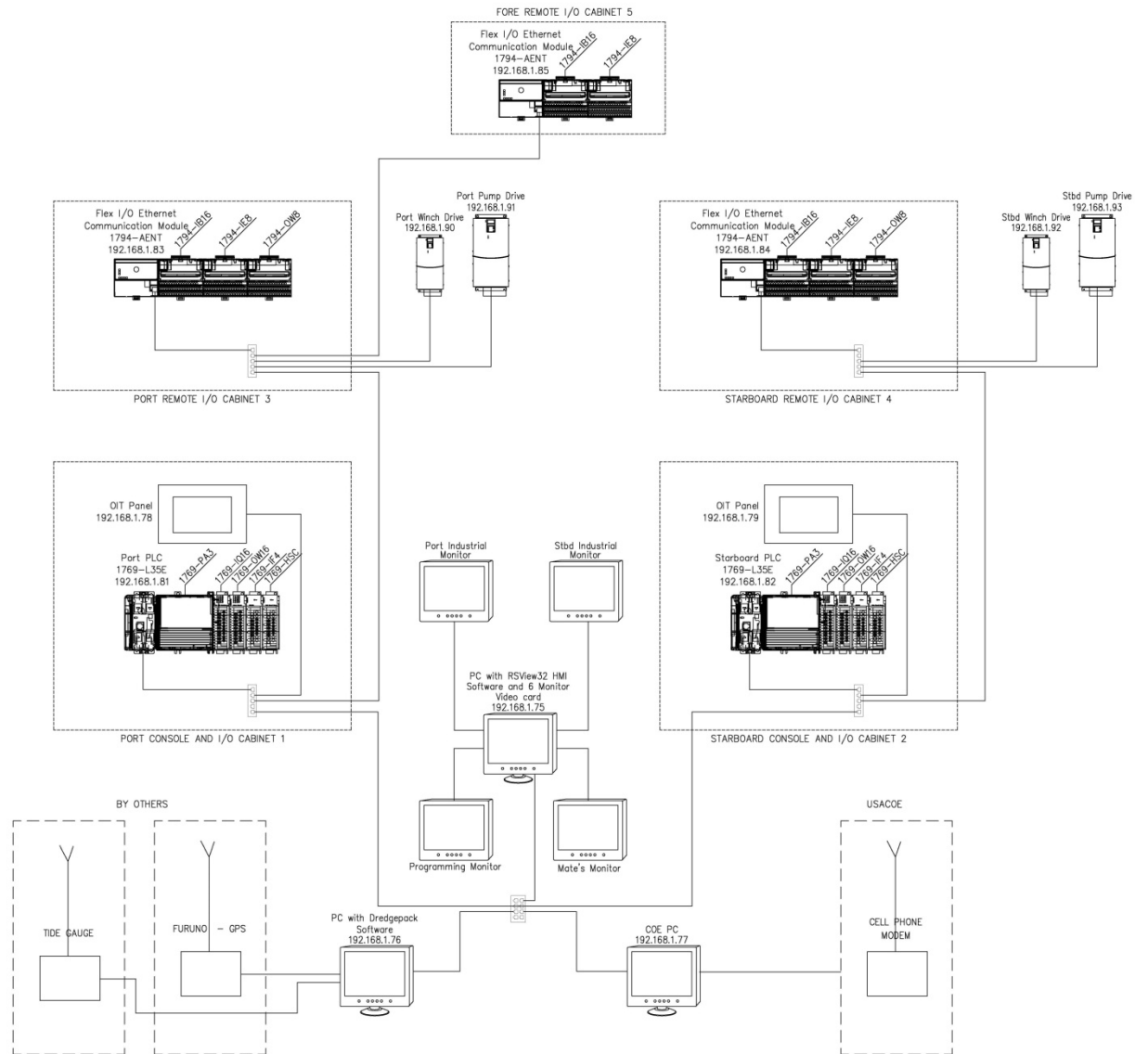


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# Control System



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# Bridge Consoles



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# Dredging Consoles



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# Dredging Consoles



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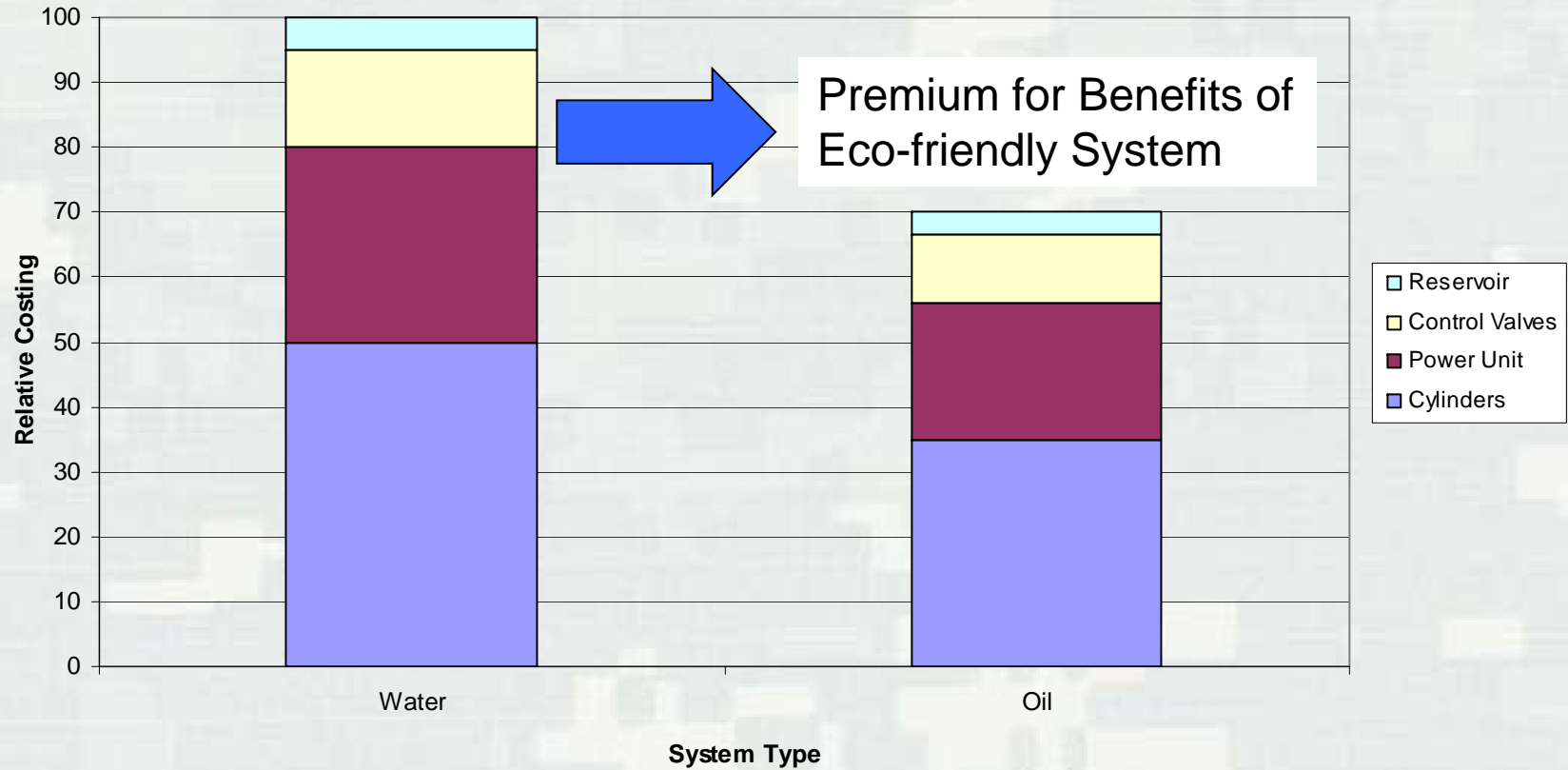
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# Water Hydraulic Cost Dynamics

Water vs Oil Hydraulic Costs



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# Lessons Learned

- Main Cylinder Hydraulic Latch
- Flow Control Refined (open too violent)
- Cylinder Cofferdam Bottom Drain
- Power Limitation



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# Summary/Conclusion

- MURDEN demonstrates that water hydraulics is viable for application in commercial navigation and marine projects.
- Water hydraulics can provide an equivalent solution to oil in terms of function and performance (in most cases).
- Additional cost is justified by significant environmental benefit gained by using water as the hydraulic media.



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# DISCUSSIONS/QUESTIONS

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