

Manufacturing excellence for modern shipbuilders

Operational excellence: Safety | Quality | Delivery | Cost

Understanding your expectations

Through direct observation of fabrication processes and by collaborating with industry leading shipyards across the globe, Hypertherm identified many opportunities for significant gains in operational excellence. Upon full implementation, these recommendations have helped to streamline the flow of product manufacturing, increase productivity, reduce costs, and have led to a marked improvement in employee health and safety.

Industry concerns and opportunities

In looking across value streams, it is evident that modern shipbuilding methods are well-established and that the team is comfortable with current processes and tools. Still, there are instances where we observed non-value-added activities such as excessive material handling and inefficiencies through the use of outdated technology. Although the use of carbon arc gouging and oxyfuel is widely used and proven, shipbuilders are addressing the above operational challenges by adopting newer, more efficient technology better suited to today's reality.



Global shipbuilding challenges

Safety risks – Combustible gases causing fires and asphyxiation, ergonomic impacts and eye injuries from vibratory grinding equipment, trips and falls due to cluttered workspaces, fumes from cutting and welding processes, hand/foot crushes from dropped material.

Material handling – Low utilization of capital equipment due to the time required for loading and unloading material, the coordination and investments in overhead cranes, challenges with positioning and aligning subsections.

Distortion – Angular and buckling due to heat inputs from welding and cutting driving excessive rework, degrading the structural integrity of assemblies and causing poor aesthetics degrading the structural integrity.

Secondary operations – Bevel cutting, grinding and rework are all labor-intensive activities that reduce productivity, increase the chances of accidents and drive up costs.

Skilled labor availability – Finding, training, and retaining employees is a top challenge for the industry. The work is perceived as difficult and dirty in which younger generations are not interested. Time to fill open positions and time to train to proficiency are extensive and costly. This is driving the trend of automating repeatable and laborious tasks.



2 times
injury rate
during rework

Top safety concerns

- Hands: crushes, cuts, burns.
- Eye injuries: metal chips, flash arc from welding.
- Ergonomics: forceful exertion; shoulder, neck, back.
- Trips: tripping hazards and falls.
- Death: severe burns, falls, explosion.



7 days to
train oxyfuel

Cost – skilled labor issues

- High turnover
- Language barriers
- Recruitment difficulties
- High scrap rates

Shipyard improvement opportunities

Number of employees

Hourly labor rate

Raw material



Clean/Paint



Mech cutting



Beveling



Grinding



Panel welding



Block assembly



Main assembly



Final assembly



Value creation*

SKELETON REMOVAL

Time savings/year (hours)

Productivity increase

Labor cost savings

BEVELING

Time savings/year (hours)

Productivity increase

Labor cost savings

MARKING

Time savings/year (hours)

Productivity increase

Labor cost savings

TEMPORARY ATTACHMENTS

Time savings/year (hours)

Productivity increase

Labor cost savings

GENERAL CUTTING

Time savings/year (hours)

Productivity increase

Labor cost savings



- Improve ergonomics
- Reduce tripping and falls
- Reduce material handling
- Increase efficiency
- Remove gas cylinders



- 4 times faster than oxyfuel
- Reduce footprint
- No preheating
- Alleviate bottlenecks
- Improve productivity



- Eliminate hand punching
- Reduce hand injuries
- 10 times productivity increase
- Quality improvement



- Cut nearly flush to base
- Reuse attachments
- Reduce grinding
- No scarring of base plate
- No preheat
- Huge time savings



- Eliminate fuel gases
- Eliminate fire watchers
- Increase productivity
- Reduce heat-affected zone
- Reduce warpage

*Calculations are based on 12 mm (1/2") mild steel thickness and standard industry data.

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