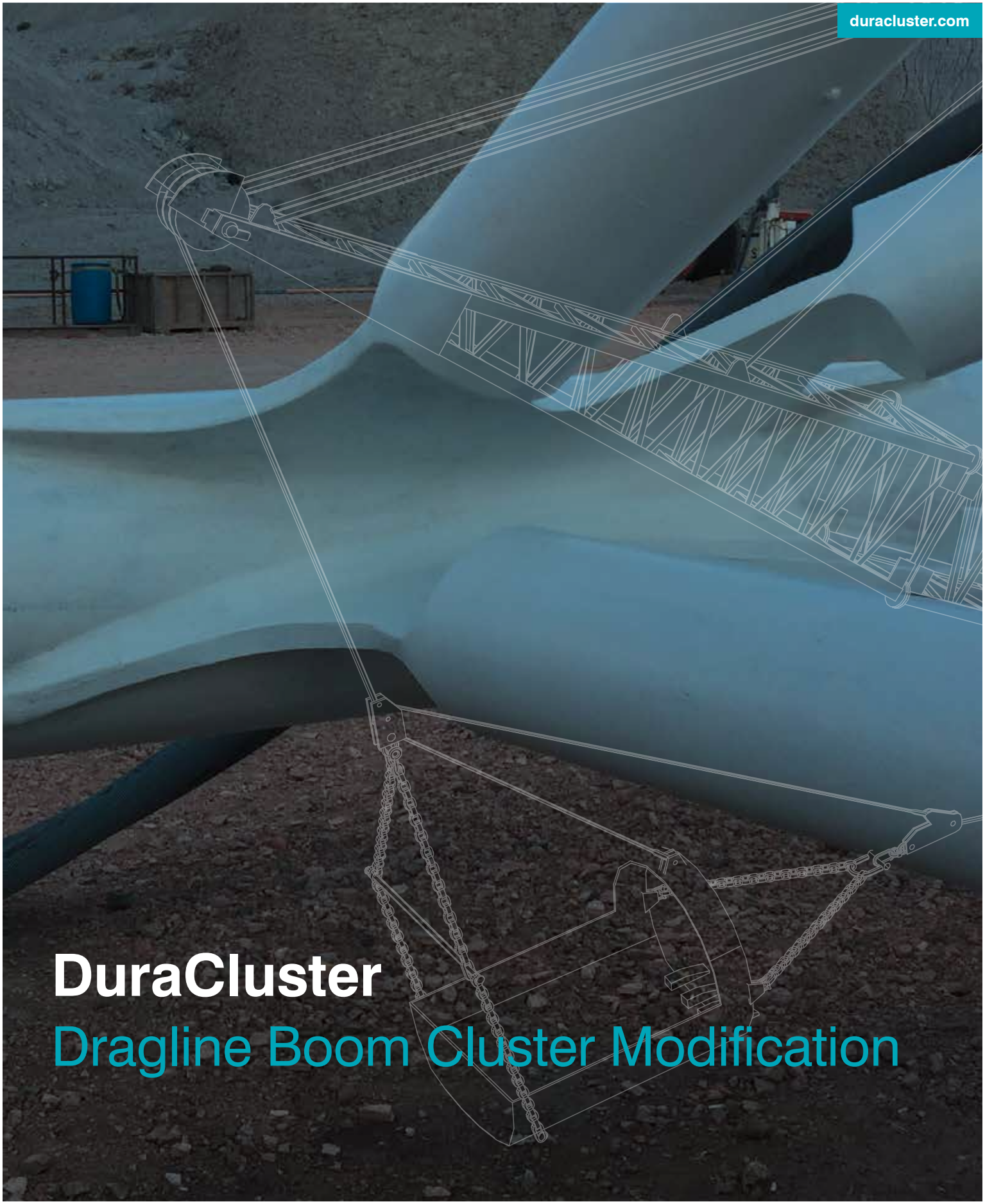
BMT

duracluster.com



DuraCluster

Dragline Boom Cluster Modification

Extending life, reducing cost

We offer the smart way to upgrade tubular boom clusters and extend the life of your draglines

The draglines so essential to many mining operations have long booms constructed from tubular chords with interconnecting lacings welded to those chords at cluster joints. Stresses concentrate at those cluster joint weldments and, all too often, fatigue cracking becomes endemic.

With a boom replacement costing $20 million and three months' downtime, repair costs become unsustainable. These are the issues that led us to create DuraCluster, an innovative design modification and repair scheme which dramatically improves performance on existing tubular-boom draglines.

Longer life, less downtime, significantly lower cost: how can DuraCluster improve your operations?

DuraCluster is BMT's patented technological solution covering structural connectors for dragline boom and mast tubular clusters, and methods for repair, reinforcement and life extension of dragline booms and masts.

The problem

Draglines have long booms comprising a number of tubular chords with interconnecting lacings welded to the chords at cluster joints. Stresses are concentrated at the cluster joint weldments and, over time, fatigue cracking can become endemic.

This cracking at the cluster joints on a dragline's tubular chords creates three significant, unsustainable costs:

Unsustainable costs of repeat repair

Cost of crack detection

- Visual inspection is difficult due to the complex geometry
- The crack must propagate through the chord wall before detection is possible
- Substantial crack growth is required before it can be found, which significantly increases the risk of a catastrophic failure

Cost of replacement and downtime

- A single boom replacement can cost an estimated $20 million
- Replacement requires a three month machine outage
- Boom replacements expose operators to a potentially high risk task with major financial consequences

Cost of repair

- Cutting and replacing windows in lacings increases the potential for failure in the lacing
- Poor access for achieving a quality repair to the chord
- Coping adds time and cost
- Cranage, scaffolding adds to cost

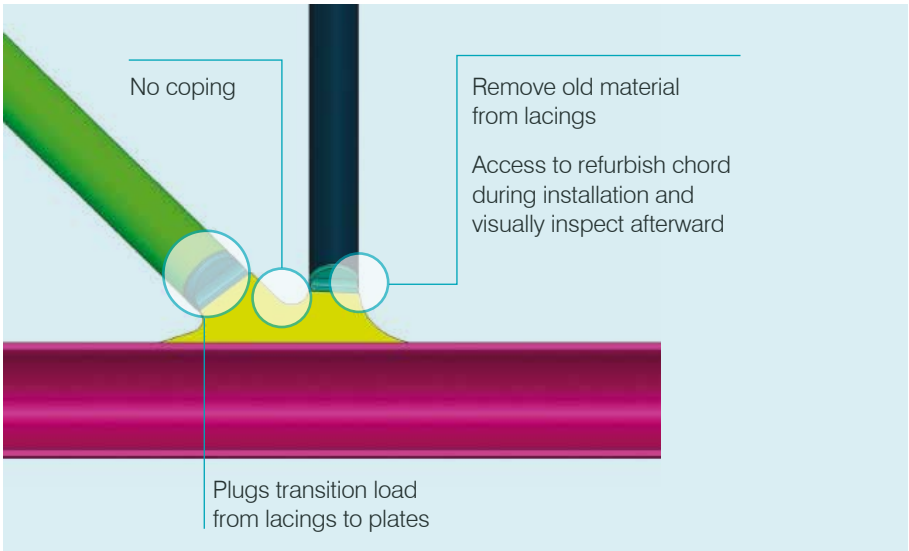
The solution

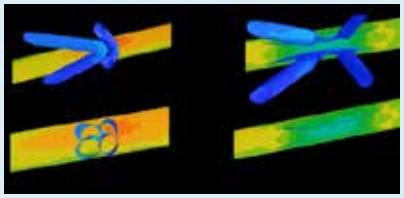
We have used our extensive knowledge of the mining industry, stress monitoring, materials and equipment engineering to innovate a practical alternative: DuraCluster.

DuraCluster is an improved design modification and repair scheme that dramatically improves the fatigue performance on existing draglines with tubular boom designs.

How DuraCluster benefits your dragline operation

- Very easy installation, ± 1 week per cluster
- Cost savings up to $18M can be made on a major boom repair
- Multiple clusters can be modified simultaneously
- Significant reduction of stress concentrations
- Improved load paths
- Reduced risk
- Dramatically extend the fatigue life of tubular boom and mast structures (Est. 15-20x)
- Excellent access for welding ensures all damaged welds are repaired
- Reduced maintenance and inspection workloads moving forward
- Easier inspection and NDT on the upgraded cluster design

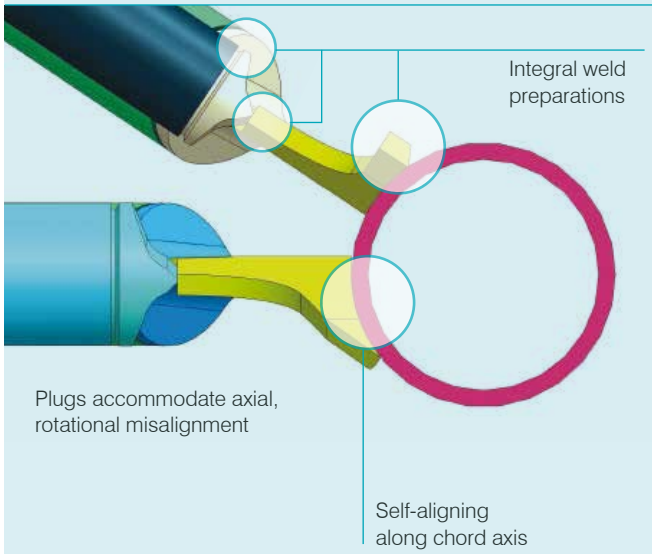




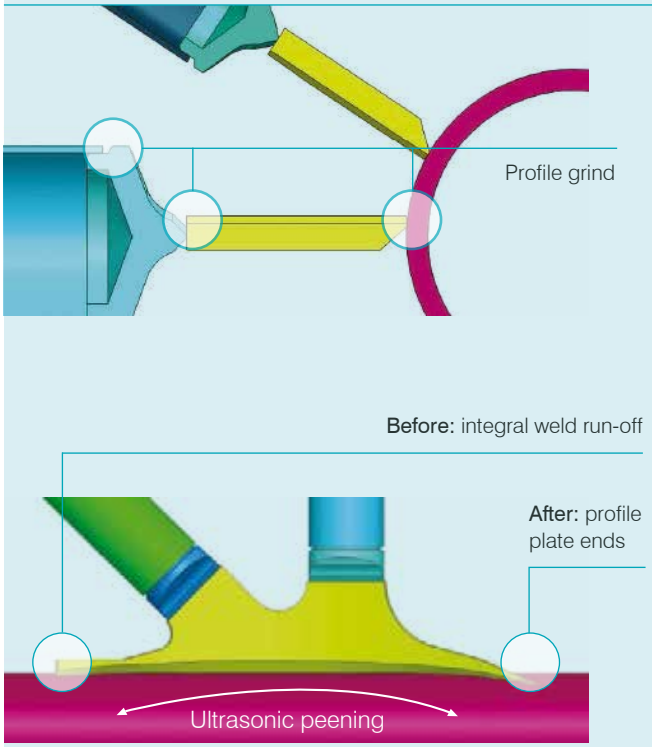
- Shaped plates have improved load path and reduced stress concentrations
- Curvature increases plate stiffness
- Self-aligning

The procedure

1: Fit plugs and plates



2: Weld, profile grind, inspect, stress relieve



Attach engineered bracing to maintain geometry

Remove lacing member ends adjacent to the main chord, repair surface of main chord to pass 100% UT inspection

Prepare lacing ends and main chord surface for welding

Weld new members

Complete post weld actions, apply corrosion protection coatings

Features

- High frequency, low amplitude ultrasonic impact
- Relieves residual tensile stress in weld
- Can double fatigue life
- ~400mm/min
- Installation support provided
- Engineered solution for boom support and bracing
- Integral alignment jig
- Weld procedures to relevant codes
- Weld QA and NDT
- Post-weld fatigue enhancement procedures
- ~ 1 week per cluster, depending on extent of chord repair required
- Modify multiple clusters simultaneously
- Can potentially be done with boom suspended (requires engineered bracing)

We apply engineering, science and technology to help customers design, manage, maintain and improve their assets. Founded on a century's heritage in the marine environment and with a worldwide network of offices, we are an independent organisation held in trust for its employees.

Want to learn more about how we can support you?

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