

# LINDOFLAMM<sup>®</sup>: Removing of Distortion in Post Welded Steel

## Business benefits

- Quality improvements, 100% reduction in distortion
- Process improvement, improved productions and reducing bottlenecks
- Labour cost reduced
- Straightening time reduced
- Limited capital expenditure required
- Improved safety

Distortion in steel can require manual work to rectify. This takes some, which in turn adds substantial labour costs.

Recently, BOC were approached to provide a solution to remove distortion in the deck of a ship. The unevenness was caused whilst welding small sections of steel together to create a very large, flat steel surface. BOC provided a solution to use an oxy-acetylene flame to remove distortion. The customer is a respected and successful engineering support services company who operate in a number of different markets including ship building.

## The issues

### Quality

When welding steel, the metal reaches a temperature of above 1400°C and expands. During cooling the metal contracts which causes pull on the weld area, often resulting in distortion of surrounding material.

Our customer was experiencing extensive angular distortion, the most frequent and most visible form of distortion between +10mm and -19mm. To pass Health & Safety standards this should not exceed +/- 5mm.

### Benefits

The main benefits for distortion removal are:

- reduced standing water, resulting in reduced corrosion
- improved aesthetics – the deck (or hull) has an even appearance
- reduction in the use of resin or cement before painting. Therefore reducing overall cost
- improved health and safety standards by reducing trip and slip hazards on horizontal surfaces



Visible distortion in a steel hull

## The BOC solution

BOC's technical process specialists visited the site and conducted a number of inspections before concluding that using BOC's LINDOFLAMM flame straightening burners with Acetylene would significantly improve the ability to remove distortions.

LINDOFLAMM flame straightening burners accurately heat an area of the working surface. The subsequent cooling causes desired contraction which leads to an intended change of shape and the removal of the distortion.

The primary flame intensity and high heat transfer rate of the Acetylene flame penetrates deep into the work piece and is monitored via the annealing colour of the surface. When the dark red glow fades quickly then flame settings are optimal. This normally occurs at 650°C.

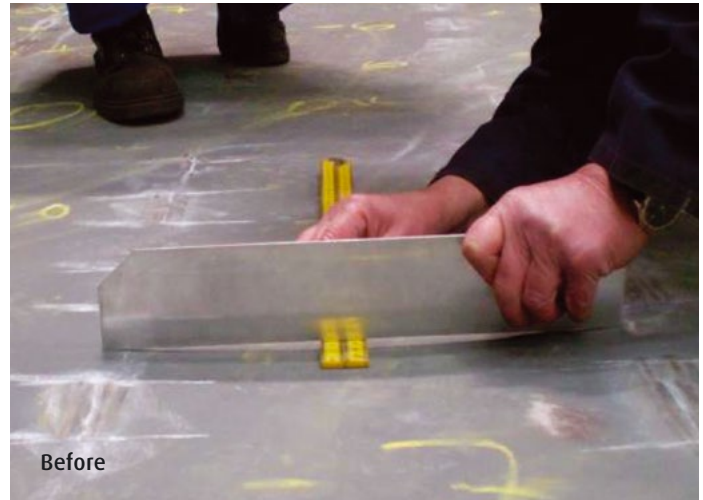
In contrast to manual (by hammer) or mechanical removal of distortions the LINDOFLAMM flame straightening burners enable distortion to be removed precisely and efficiently.

## Customer Benefits

During the trial, 80% of angular distortions were removed during the first attempt. A second attempt successfully removed the remaining distortion. The customer was very satisfied with the output and has continued to use BOC LINDOFLAMM flame straightening burners and acetylene for their straightening requirements. The rationale behind this decision was to reduce the amount of manual labour to remove distortions. This has led to:

- reduced straightening time and increased productivity
- reduction in overall cost due to the decrease in labour cost
- ability to meet customer deadlines and quality standards

For further information on any of the items referred to in this case study, please speak to your account manager or use the contact details below.



Distortions of -19mm before flame straightening



Distortions levelled after flame straightening

## BOC Limited

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