PMC Engineering Solutions, Inc.

PMCap (Patent 6,860,297) Repair Method

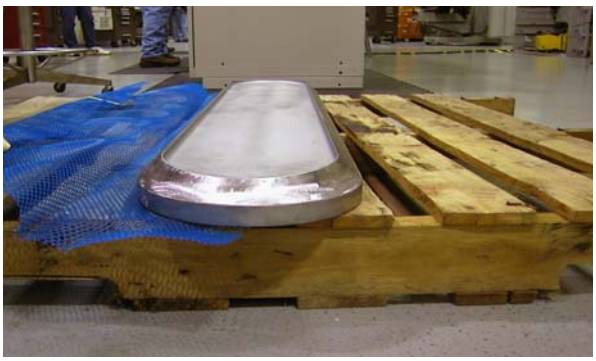
Pressure Boundary Repair Component for Piping and Pressure Vessels

- The ***PMCap*** repair method provides users with a quick and cost effective alternative to flush patch and weld overlay repairs.
- The ***PMCap*** is welded to the outside surface of a component using a full penetration weld and replaces the encapsulated pressure boundary.
- Code compliance is restored without requiring degraded area removal. Cutting of pressure boundary, foreign matter intrusion, and exposure of vessel internals to the environment, is eliminated.
- The ***PMCap*** includes a corrosion allowance, or can be constructed of corrosion resistant material or with a corrosion resistant liner.
- ***PMCaps*** are designed and constructed to ASME Code rules and are supplied as ASME code-stamped components. The complete package includes hardware, partial data reports, shop fabrication drawings, material test reports, and certified calculations.
- Please refer to our ***Fitness for Service*** software and unique ***Metal Loss Evaluation Charts (MLEs)*** for evaluating local thin areas prior to performing repairs.
- Total hardware and installation costs using the ***PMCap*** Repair Method are significantly less than those associated with traditional flush patch and weld overlay methods.

As-Constructed Split *PMCap* (Underside View)

***PMCaps* – Ready for Shipment**

Installed Split *PMCap*



As-Constructed Obround *PMCap*

For more information on the ***"PMCap"*** repair method refer to www.pmcengineering.com

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PMCap Advantages

The ***PMCap*** has several advantages over the traditional "flush patch" or "weld overlay" methods of repair, and alleviates many negative aspects. Advantages of the ***PMCap*** repair method include but are not limited to: The ***PMCap***:

1. **does not require cutting out local degraded material areas**
2. **requires minimal preparation of pressure retaining material**. In contrast, "flush patch repair" or "weld build-up repair" methods may require significant weld preparation.
3. generally **smaller than flush patch.** Flush patch must match surrounding material thickness. *PMCaps* may be attached to sound material of any thickness that meets code requirements.
4. **does not require, but allows use of, weld joint backing strips** in the attachment weld between the pressure retaining item and the ***PMCap.***
5. **eliminates exposure of personnel to lethal or hazardous fluid contents** such as chemical, gas, or radioactive fluid contents of a pressure retaining item.
6. **eliminates potential damage to internal parts** of pressure retaining items such as damage to tubes of heat exchangers
7. **eliminates potential intrusion of foreign materials** into the internals
8. **simplifies any required hydrostatic or pneumatic testing** of pressure retaining item since pressure boundary is not breeched
9. **is not limited to a specific geometrical shape** and may be constructed to most any regular or irregular shape including but not limited to round, obround, square, or any combination of the these shapes. May be split to encapsulate nozzles.
10. generally **only requires surface examination of attachment welds**, however, full volumetric examination of welds is possible
11. **satisfies all ASME Code criteria, National Boiler Inspection Code, API-610 Pressure Vessel Inspection Code,and has been accepted by State Jurisdictional Authorities and major insurance carriers**

For more information on the ***PMCap*** Repair Method refer to www.pmcengineering.com or contact:
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