激光熔覆技术典型案例：1）芬兰Fortum：修复汽轮机低压缸末级腐蚀的革新技术

Fortum – Finland, Laser cladding of steam turbine casing July 2016

Challenge 项目描述

- A common problem on (low pressure) steam turbines is the development of erosion damage at the final stage diffusor area.
  低压汽轮机的常见问题是末级扩流道腐蚀的发展.
- Erosion damage develops due to the impact of high velocity water droplets and washing which occurs during the operation of a turbine.
  腐蚀的原因是运行期间高速水滴的冲击和磨损.

Solution 方案&执行

- Stork has developed an innovative repair solution using laser cladding to prevent the progression of damage and ensure safe and reliable operations.
  施托克开发了革新的方案,采用激光熔覆技术来防止损坏的扩展, 以确保安全可靠地运行.
- A clad layer with wear resistant properties is applied to the damaged surface of a casing.
  在壳体易损区域熔覆一层耐磨材料.
- The mechanical properties of the cladding material create a barrier to prevent the damage from progressing.
  熔覆材料形成一个机械保护层, 以阻止破坏的进一步发生.

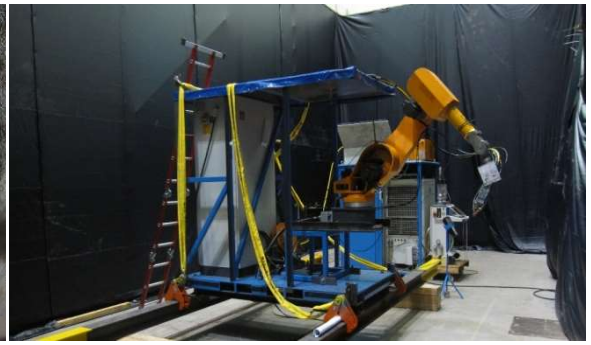
Benefits

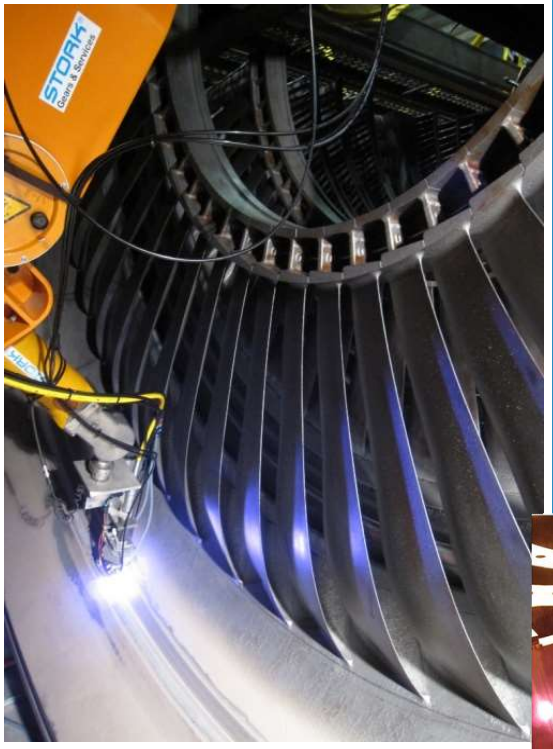
- Cost effective repair solution. No need to replace casing or apply expensive OEM repair solution.
  不需要更换壳体, 或采用OEM供应商的昂贵维修方案, 检修成本低.
- The repair solution can be executed in-situ. Asset down time is reduced to a minimum.
  现场实施维修, 工厂停运时间降到最低.

Key Figures 关键数据

Cost effective repair solution
维修方案经济性好

No need to replace the casing
无需更换壳体





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Erosion damage at diffuser area

低压缸扩流区域冲刷磨损





Steam turbine repairs – installation & cladding

现场激光熔覆作业修复

Hoisting the equipment on the casing

设备就位

Programming & teaching the robot

机器人程序准备

Cladding the casing on-site

现场激光熔覆作业

激光熔覆技术典型案例：2）壳牌炼厂项目：泵轴维修

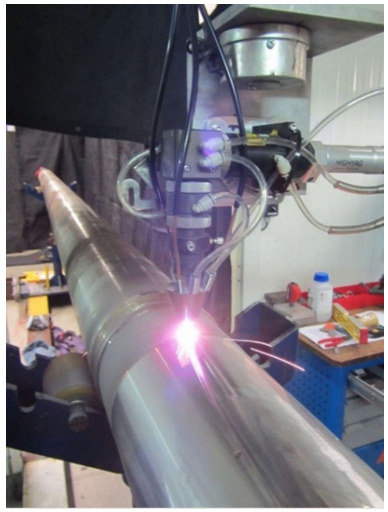
Shell – The Netherlands, Laser cladding pump shaft

Challenge 项目描述

- During a planned overhaul on a pump, the customer identified several out of tolerance journals on a long (7600 mm) shaft.
  在计划检修中，客户检查出几处长轴(7600mm)公差超标
- As the pump was an important back-up system for the refinery, the part needed to be replaced or repaired with a short lead time.
  该泵是炼油厂重要的辅助系统，该部件需在短期内更换或修复

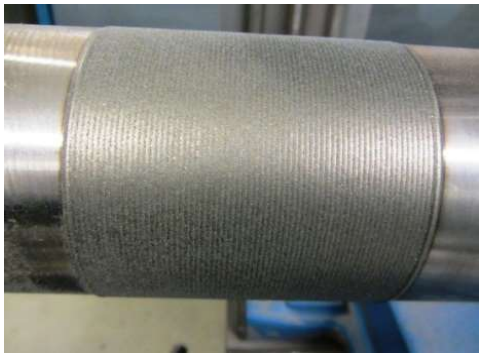
Solution 方案&执行

- The shaft was inspected, pre-machined, laser cladded and lathed to the right final dimensions within days.
  短短几天之内，该轴被检测，预加工，激光熔覆，车削，达到规定的尺寸
- Due to Storks extensive machine shop all repair steps could be carried out consecutively.
  施托克的工厂具备各种加工机械，所有步骤按序顺利进行



Benefits 优势

- Independent from inflexibel OEM
  比OEM制造商更具灵活性
- Repair cost 75% lower than replacing the original part.
  修复成本比更换成本低75%
- Repair lead time < 1 week instead of 12 weeks for new part.
  修复时间小于1周，远小于制造新部件的12周
- Due to the properties of the applied material, the mea time between failure is extended.
  应用的材料特性好，延长了使用寿命



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