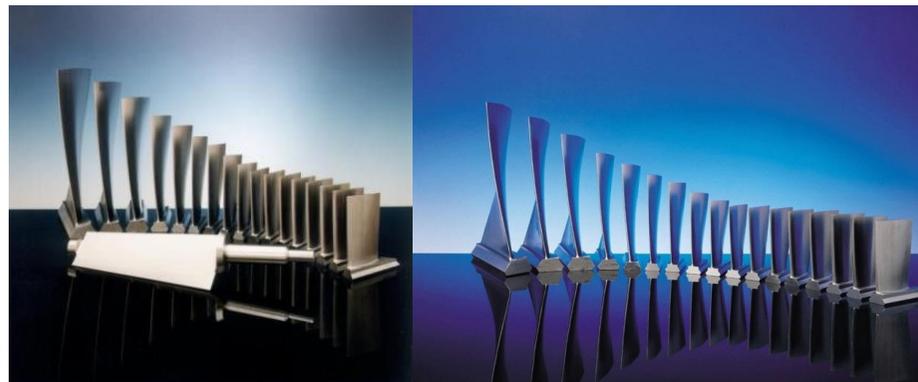


# Stork Turbo Blading

## 第二部分：叶片制造

- 汽轮机/燃机冷端/压缩机/膨胀机；  
Blades manufacturing for ST/GT/Compressor/Expander
- 荷兰/美国两个工厂 Two workshops in NL and USA;
- 独立于OEM透平原厂商的世界著名叶片制造商

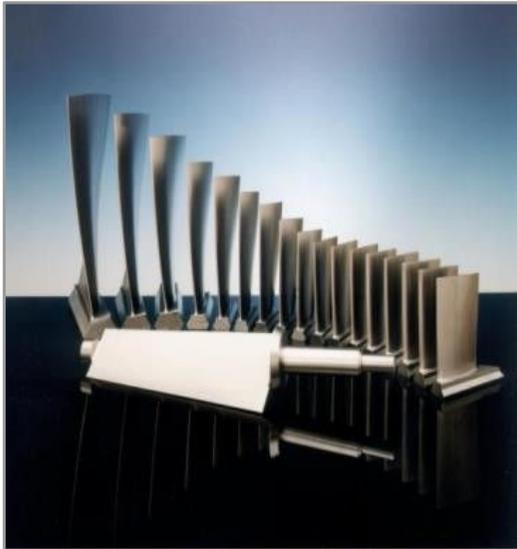


### Overview 概要

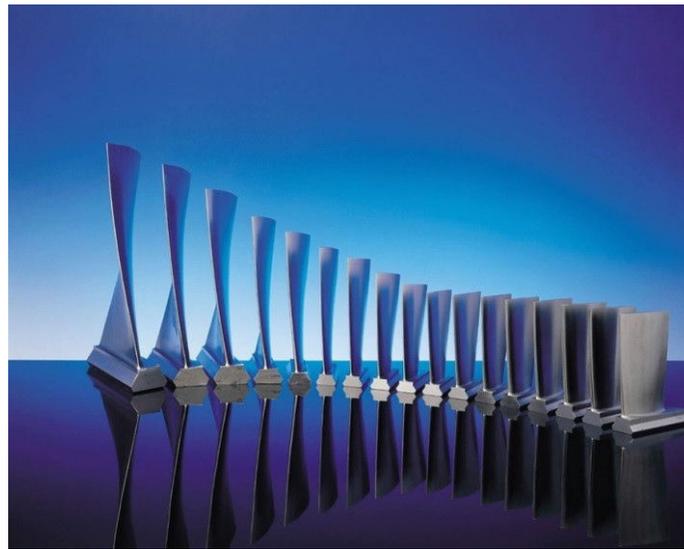
- Independent Aftermarket Turbine Blade Manufacturer 独立的透平叶片制造商
- 50 years of experience **50多年加工经验**
- ISO 9001 Certified ISO 9001认证
- ITAR Facility ITAR工厂
- Manufacture new steam and gas turbine blades 加工新型蒸汽和燃机透平叶片
- Over 36 CNC machining centers **超过36台 CNC加工中心, 年产9万多片**
- Raw material inventory 原料存货
- Manufacture from either reverse engineered samples, models or drawings **来样, 模型逆向工程或者图纸加工**
- Together with our sister company, Stork Turbo Blading, Holland, we form the largest independent blade manufacturer supplying the Power Generation market today. **独立的叶片制造供应商。**

# GAS TURBINE COMPRESSOR BLADES

## (一) 燃机压缩机叶片



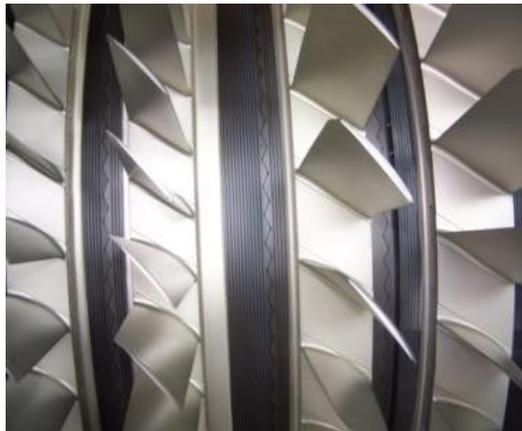
GE MS5001/2 | MS6001B



GE MS7001B/E/EA/FA - GE MS9001E/FA



WH 501



Siemens  
V64.3/V84.2/V94.2



Alstom (part of GE)  
GT10/GT11/GT13/GT24-26

- Reverse engineered parts  
零部件逆向工程
- Reference Types: all Major OEM' s  
参考类型: **所有主要OEM燃机厂家**
- Keep main types on Stock  
库存保留主要产品类型
- Turbine (hot) Blades for smaller Gas Turbines  
**除大型燃机冷端叶片外, 还提供小型燃机的热端叶片**



# 燃机透平压缩机叶片 (冷端叶片)

Stork Turbo Blading supplies high-quality blades and components for virtually all gas applications required by OEMs, Service Providers & End Users. We have a large inventory of gas turbine blades plus extensive engineering and manufacturing capabilities. For those parts not in stock, we supply you with the right parts quickly. Our team delivers on site, where and when you need it.

施托克透平叶片制造公司的客户对象为原产商、维护服务提供商和最终用户，能够为他们提供几乎所有类型的燃气透平压缩机优质叶片和部件，拥有大量的燃气叶片库存。由于具备强大的设计和制造能力，对于那些没有存货的部件，也能快速供应。另外我们的团队会快速响应，在客户所需的时间和地点提供服务。

在荷兰和美国拥有两个叶片制造工厂。

## KEY SERVICES 关键服务

- A wide range of blades of Gas Turbines available, including F- & H-Class Turbines. 供应各类燃机冷端叶片，包括 F- & H-级燃机。
- Stock availability of most GE Type Models Gas Turbine Compressors 大部分 GE 典型的燃机压缩机叶片均有库存
- One Stop Shop concept 一站式服务理念
- Digitalisation service 数字化服务
- High technology facilities 高技术加工设备
- Extensive machining capabilities 强大的加工能力
- Dedicated service resources 专业的服务资源
- Engineering capabilities 强大的设计能力
- Quality assurance 质量保证
- Worldwide trusted Supplier 全球可信赖的供应商

## ADDED VALUE 竞争力

### • Alternative to OEM & OEM Supplier

能够替代原厂商及其供应商

### • Full warranty 全面保修

### • Reverse engineering

强大的逆向工程能力

Most Gas Turbines have already been engineered by Stork. When drawings are not available Stork can offer a solution to End Users by Reverse Engineering through 3D Scanning.

施托克拥有市场上大部分类型的燃气透平叶片图纸，即便确实少量图纸无法获取，施托克可以通过 3D 扫描，利用逆向工程来解决。

### • Fast delivery

快速交付

Lead time, including engineering, is faster than OEM

交货期包含设计在内，比原厂商短。

### • Extensive Material Stock

充足的原材料库存

All typical compressor blade materials in stock. 库存有所有典型的压缩机叶片。



## 常备的原料库存

Gas Turbine(hotsection)			
Designation 材料名称	Standard 标准	Trade Name	Stock**
Alloy 520		Udimet520	
Alloy 720		Udimet 720	
AISI310S	DIN 1.4845		
Alloy 105	DIN 2.4634	Nimonic105	
Alloy 718	DIN 2.4668	Inconel 718	
Alloy 80A	DIN 2.4952	Nimonic80A	
Alloy 90	DIN 2.4969	Nimonic90	

Expander			
Designation 材料名称	Standard 标准	Trade Name	Stock**
X3CrNiMoN27-5-2	DIN 1.4460		
X2CrNiMoCuN25-6-3	DIN 1.4507	Super Duplex 2505	
X5CrNiNb17-4	DIN 1.4542	17-4PH	yes <sup>(H1150)</sup>
Alloy 625	DIN 2.4856	Inconel 625	

Gas Turbine (compressor), Axial Compressor, Fans			
Designation 材料名称	Standard 标准	Trade Name	Stock**
AISI403Cb			yes
AISI418			
X4CrNiMo16-5-1	DIN 1.4418		
AISI403	ASTM-A276		yes
AISI422Cb	DIN 1.4913	H-46	yes
X20Cr13	DIN 1.4021		yes
X5CrNi18-10	DIN 1.4301		yes
X5CrNiNb17-4	DIN 1.4542	17-4PH	yes <sup>(H1150)</sup>
X12CrNiMoV12-1	DIN 1.4939	~/-Jethete M152	yes
X12CrNiWTiB1	DIN 1.4962		
6- 13			
Alloy 718	DIN 2.4668	Inconel 718	
C450	DIN 9.4596	Custom 450yes	
AlZn5Mg3Cu	EN AW 7022		
AlCu4SiMg	EN-AW 2014		
AlCu2Mg1.5Ni	EN-AW 2618A		
AlMg2Mn0.8	EN-AW 5049		
ST12T / TE / TNiE	Equivalentto ABB/ALSTOM		
ST17/13W	Equivalentto ABB/ALSTOM		
ST70AH	Equivalentto ABB/ALSTOM		

# STEAM TURBINE BLADES

## (二) 蒸汽轮机叶片



- Blade length up to 1500mm  
叶片最大长度 1500mm
- Mainly on basis of reverse engineering  
主要基于逆向工程设计
- Experience on all main OEM's  
所有主要的OEM厂家叶片经验
- Nuclear experience  
核电叶片经验

# STEAM TURBINE BLADES

## 蒸汽透平叶片: 设计和制造

施托克透平叶片制造公司为各类型的蒸汽透平和几乎所有类型的燃气透平供应优质叶片和部件。并服务于所有主要的透平原产商、维护服务公司，也直接为最终用户服务。

### ADDED VALUE 竞争力

- Alternative to OEM & OEM supplier **能够替代原厂商及其供应商**
- Full warranty **全面保修**
- Reverse engineering **强大的逆向工程能力**

When drawings are not available Stork can offer a solution to end users by reverse engineering, through 3D scanning. We have years of experience and are a global leader in Steam Turbine Blade manufacturing.

当无法获得备件图纸时，施托克可以通过 3D 扫描，利用逆向工程来解决。我们有数十年的经验，在蒸汽透平叶片制造领域是全球领先者。

- Fast delivery: Lead time, including engineering, is faster than OEM

**快速交付:** 交货期包含设计在内，甚至比原厂商短

- Extensive Material Stock **充足的原料库存**

All typical steam turbine blade materials in stock, including NACE Quality for Geothermal Plants. 库存有所有典型的蒸汽透平叶片材料，包含地热发电厂用的 NACE 质量标准材料

- Experience with forgings for large L-0 Steam Turbine Blades.

**拥有丰富的大型 L-0 蒸汽透平叶片锻件经验**

### KEY SERVICES 关键服务

- A wide range of blades including large L-0 **供应各种叶片，包括大型 L-0 叶片**
- One Stop Shop concept **一站式服务理念**
- Digitalisation service **数字化服务**
- High technology facilities **高科技加工设备**
- Extensive machining capabilities **强大的加工能力**
- Dedicated service resources **专业的服务资源**
- Engineering capabilities **强大的设计能力**
- Quality assurance **质量保证**
- Worldwide trusted supplier **全球可信赖的供应商**

## 蒸汽透平：产品、服务提供范围、材料应用能力

Turbo Machinery Components 透平机械部件		
Steam Turbine 蒸汽透平	Steam Turbine Blades & Vanes Diaphragms, Seals, Steam Valve Spindles, Bearings, Shaft, Locking Pieces, Shrouds, Damping Wire, etc. 蒸汽透平叶片&叶片隔板、密封件、蒸汽阀轴、轴承、轴、锁紧件、护罩、阻尼线等。	Any range, all sizes Steam Turbine Blades for Conventional, Combined Cycle, Nuclear and Geothermal plants <b>所有类型所有尺寸的蒸汽透平叶片；</b> 应用对象：常规、联合循环、核电和地热发电厂。
Engineering support & Service (On- & OffSite) 现场和远程技术支持&服务	Engineering Support, Adaptive Organization. Flow Path Optimization, Computational Fluid Dynamics (CFD), Finite Element Method (FEM), Frequency Tuning, Blade Redesign, Blade Repairs. 技术支持、适应性组织。通流优化、计算流体分析、有限元分析、频率调整、叶片重新设计和叶片修理。	Capable Engineers and Extensive Knowledge Database. On-site data gathering to minimized downtime, and adaptive organization to aid Asset Owners in the best manner. 拥有经验丰富和能力出众的工程师人才和内容全面的各原厂商产品数据库。能以最少的停机时间完成现场数据收集，和自适应的组织，可以用最佳方式帮助客户。
Additional Components 其他部件	Rotors, Casings, Shafts, Diaphragms, Nozzles, Impellers, Seals, Gland Housings, Gears, Flow Path and More. 转子、机壳、轴、隔板、喷嘴、叶轮、密封件、汽轮机、减速箱、通流部分和其他	Other components possible due to our extensive network, trusted partners & Intercompany resources. 拥有丰富的公司内部资源、众多可靠的合作伙伴和广泛的外部支持网络，使我们能集成供应这些高质量的其他相关部件。

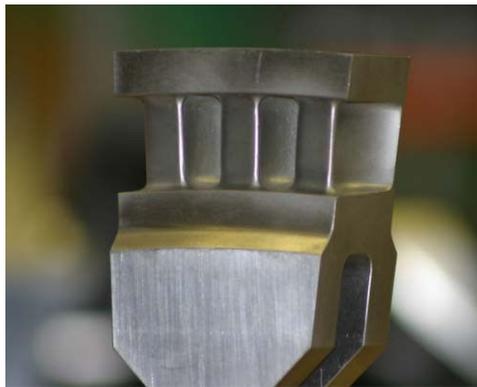
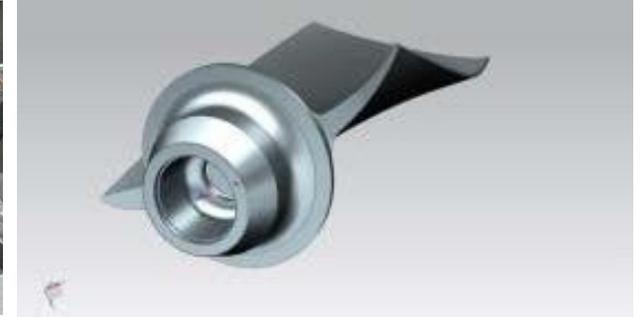
## MATERIALS EXPERIENCE 材料应用经验

Steam Turbine 蒸汽透平			
Designation 材料名称	Standard 标准	Trade Name	Stock**
AISI403	ASTM-A276		yes
AISI422	ASTM-A565		yes
X20Cr13	DIN 1.4021		yes
X15Cr13	DIN 1.4024		
X5CrNiNb17-4	DIN 1.4542	17-4PH	yes (H1150)
X5CrNiNb17-4	DIN 1.4542	Nace Quality for Geothermal 地热用NACE 质量标准	
X19CrMoVNbN11-1	DIN 1.4913	H-46	yes
X22CrMoV12-1	DIN 1.4923		yes
X12CrNiMoV12-1	DIN 1.4939	~/~Jethete M152	yes
TiAl6V4	DIN 3.7165		yes

# OTHER COMPONENTS

## (三) 其他零部件

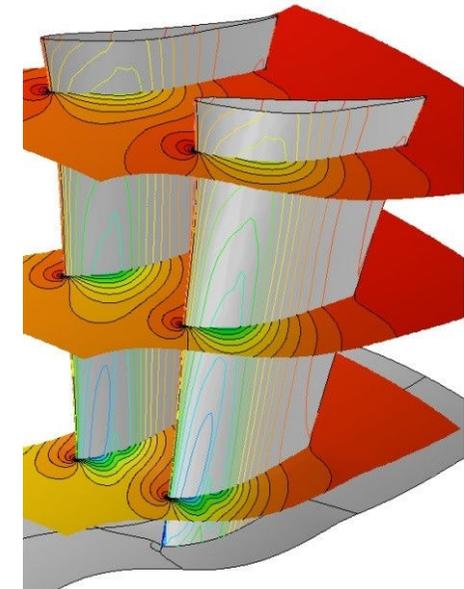
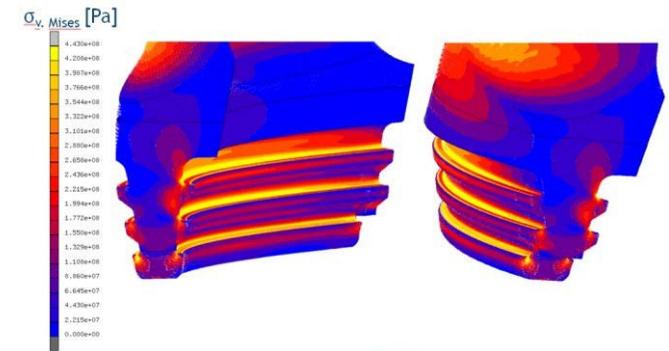
- Diaphragms 隔板
- Nozzles 喷嘴
- Aero derivative blades 航空导向叶片
- Gear components 齿轮部件
- Fan Blades 风扇叶片
- Valve components 阀门部件
- Impellers 叶轮
- Triple Pins 三叶片销
- Brazed Segments 钎焊片段



# OTHER SERVICES

## (四) 其他服务

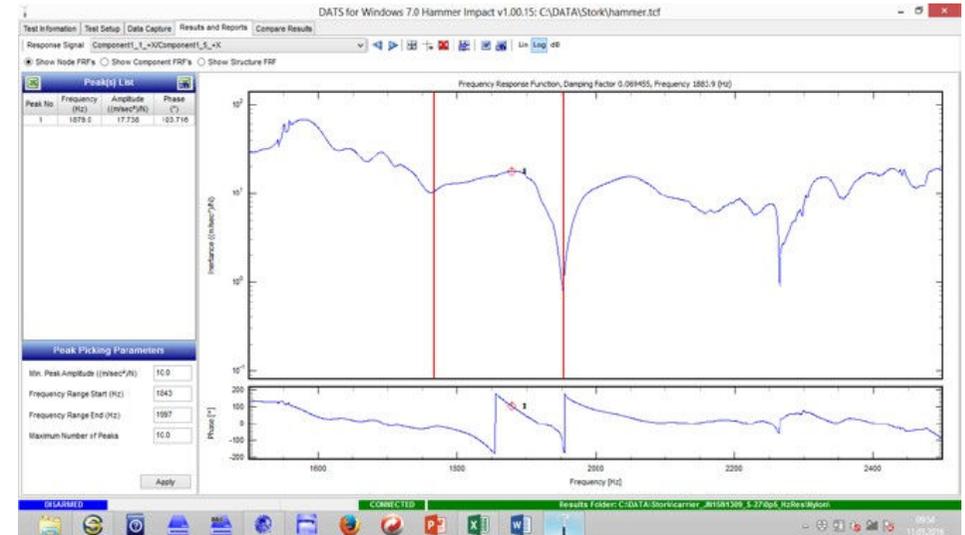
- Finite Element Analysis (FEM) 有限元分析
- Computational Fluid Dynamics (CFD) 计算流体力学
- Non Destructive Examination 无损检查
- Ultrasonic and Radiographic Inspection. 超声波和射线摄像检查
- Frequency Testing 频率测试
- Moment Weighing 扭矩称重
- (Controlled) Shot Peening (受控) 喷丸处理
- Spectral Analysis / Optical Emission Spectroscopy 频谱分析 / 光发射光谱
- Welding & Assembly, Stellite Brazing 焊接 & 安装, 司太立合金焊接
- Coating 涂层
- CTQ (Process Capability Studies) 加工能力研究



In-house or in close co-operation with other Stork or Specialist Companies  
工厂内部或者与其他施托克兄弟公司紧密合作, 或者与专业公司紧密合作。

# OTHER SERVICES

## (五) 其他服务



- Stellite Brazing 司太立合金钎焊
- Tip Repair / Welding 叶尖修理/焊接
- Heat treatment 热处理
- Frequency testing and tuning of blades 频率测试 叶片调频



# OTHER SERVICES-OPTIMIZATION

## (六) 其他服务 - 优化

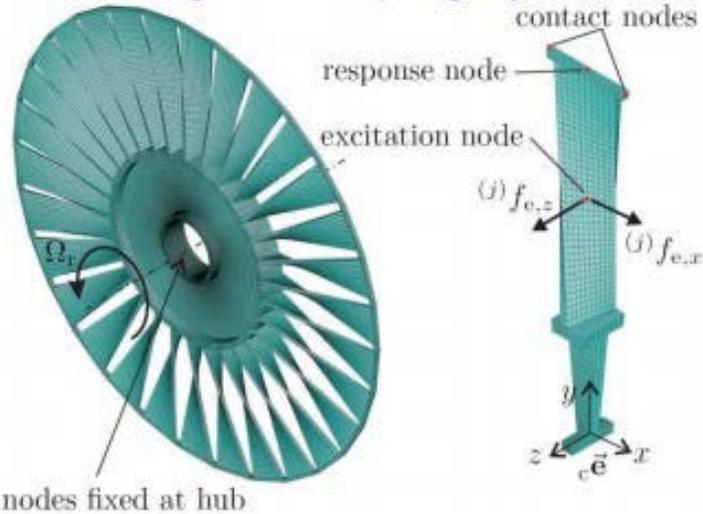
### Optimization of blade damping to reduce vibrations and dynamic loading:

叶片阻尼优化减少叶片振动和动载荷



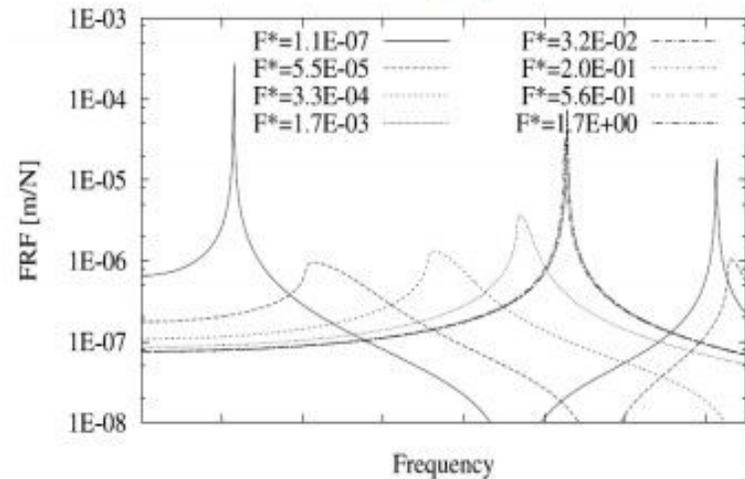
阻尼系统建模

modeling of damping system



damper optimization

阻尼器优化



# OTHER SERVICES-3D SCAN

## (七) 其他服务：3D扫描，逆向工程设计

电话联系  
Call Stork



Scan 扫描



Engineer 工程设计



Install 安装



Manufacture 加工

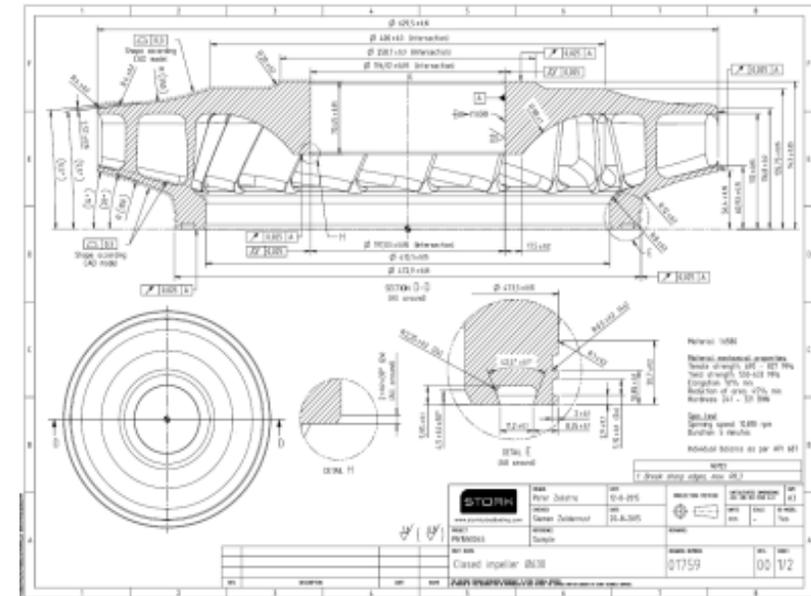
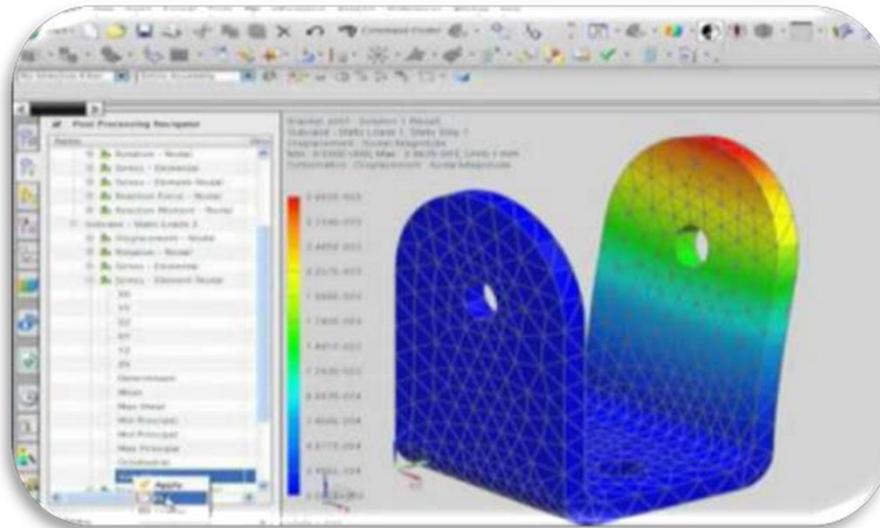


# OTHER SERVICES-3D SCAN

## 其他服务：3D扫描

- Import the scan into specialized CAD/CAM software  
专业CAD/CAM软件导入扫描数据
- Analyze wear mechanisms / damage 分析磨损机理/损伤
- Correct worn / damaged section(s) 校正磨损/损坏部分
- Recommend design improvements 推荐设计改进
- Produce engineering drawings of reconstructed part

出零件新加工图纸



# PRODUCTION / ENGINEERING

## 生产/设计 (一)

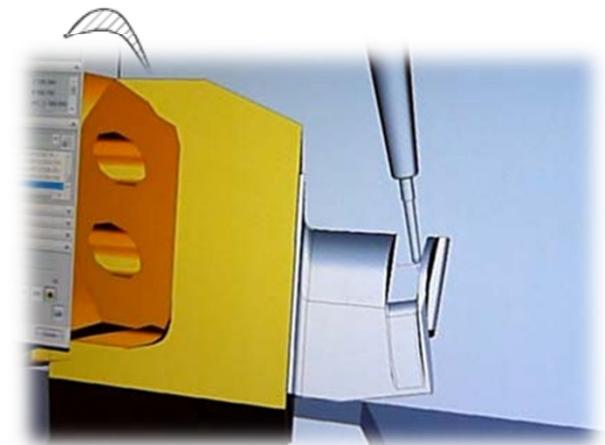
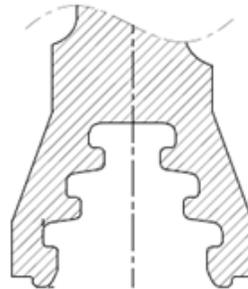
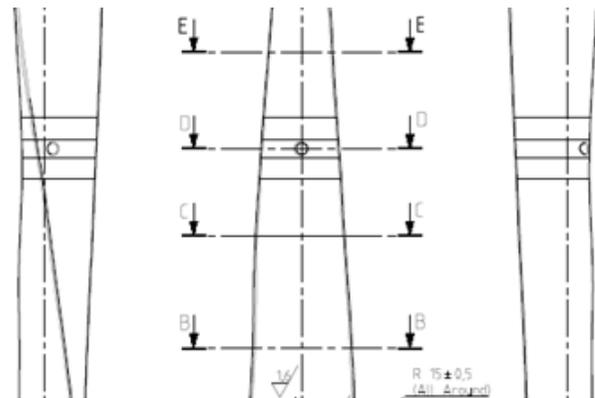
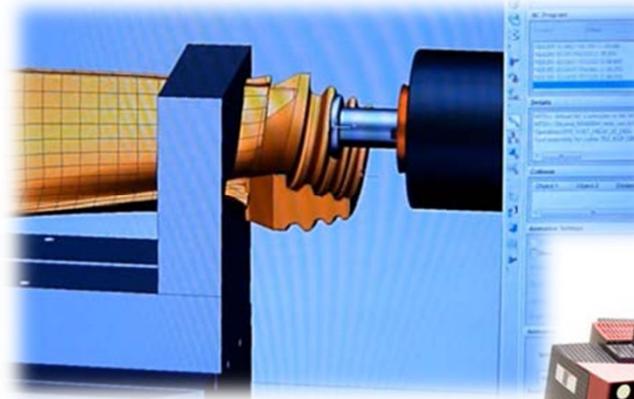
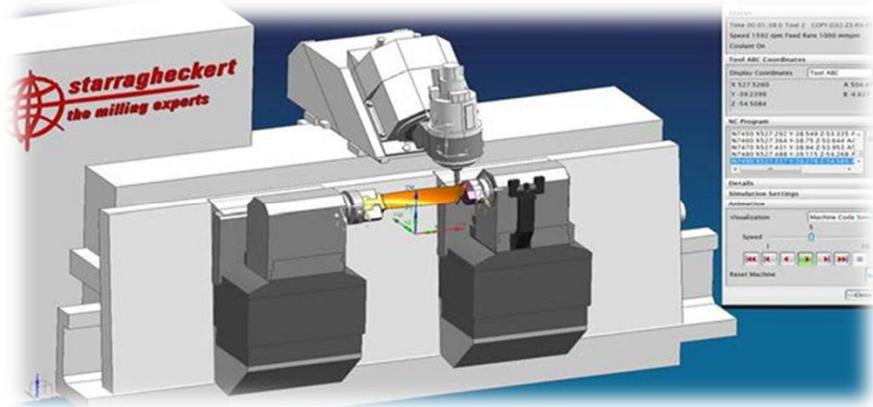


- Automated production line for GT compressor blades; 燃机压缩机叶片自动加工生产线
- 4/5-Axis Milling & EDM Technology; 4/5轴叶片铣床& EDM 电火花技术
- Over 36 Machining Centers; 36台加工中心
- 90.000 blades annually; 年产90,000片叶片



# PRODUCTION / ENGINEERING

## 加工/设计 (二)



- SIEMENS NX CAD/CAM Integrated Simulation;  
西门子 NX CAD/CAM 集成模拟
- Integrated Modelling-Manufacturing-Measuring;  
集成模块加工-测量
- Over 20 Years 5 Axis Machining experience;  
20多年5轴加工经验

# OUR CUSTOMER SEGMENT & FOCUS

## 施托克叶片-典型用户 (透平厂商、服务商和最终用户)



# 典型案例：1) 美国用户：ABB-Alstom汽机叶片 (逆向工程设计, 8级1200个叶片, 6周发货)

End user - USA 1200 blades Reverse engineered & Manufactured

## Challenge 项目描述

- Parts needed during a forced outage  
非计划停工, 需要零件
- Manufacturing 1200 blades in less than 6 weeks  
**在6周时间内制造1200个叶片**

## Solution 方案&执行

- Reverse engineering and production using multiple machines.  
反向工程设计, 多设备同时生产
- Manufacturing of 8 rows of steam turbine blades for an ABB Alstom unit.  
**制造ABB Alstom汽轮机的8级叶片**
- Stork uses high end scanning equipment to do quick reverse engineering.  
**施托克采用高级扫描设备, 便于快速反向工程设计**
- Two blading shops worked together to meet the delivery time requirement  
**两个叶片工厂同时开工以满足交货期要求**

## Benefits 优势

- Stork Turbo Blading did offer the fastest delivery time and has proven to be reliable.  
施托克叶片工厂被证明是最快和最可靠地供应商
- The unit came back on line quicker than the customer anticipated  
装置短期内重新运行超过了客户的预期
- Quicker and lower price than the OEM.  
**比OEM原厂制造商更迅速, 价格更低**
- Client was very pleased with the quality shown by Stork.  
客户对施托克的质量非常满意

## Key Figures 关键数据

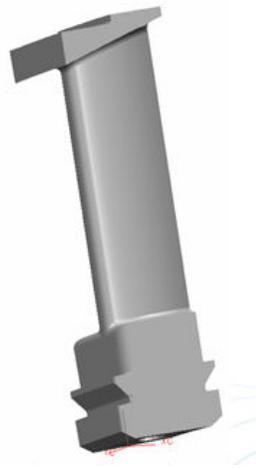
Steam Turbine  
汽轮机  
ABB-Alstom

Reverse Engineering  
反向工程设计

1200 blades  
1200个叶片

6 weeks  
6周工期

Support for final  
assembly  
组装支持



## 2) 中东用户：替换和安装燃机冷端叶片（西门子V94.2，转子和定子冷端叶片）

Service Provider - Middle East, Manufacturing all Rotor and Stator blades for V94.2

Date

### Challenge 项目描述

- Manufacturing all rotor and stator blades for a Siemens SGT5-2000E or V94.2 turbine.

#### 转子和定子所有叶片的制造

- Large diaphragms are difficult to build.  
汽轮机大隔板制造困难
- Parts needed within 6 months.  
部件制造需在6个月内完成

### Solution 方案&执行

- Stork uses high end scanning equipment to do final inspection of the large parts.  
施托克采用高端扫描设备对大隔板做最终检查
- Reverse engineering was already done by Stork. Stork has done the engineering of most heavy duty turbines and this saves time.  
施托克已经完成了反向工程设计。施托克提前完成重型汽轮机的反向工程设计以节省时间。
- Stork is an OEM supplier and knows the design criteria.  
施托克是OEM供应商，知晓关键设计点

### Benefits 优势

- Stork Turbo Blading did offer a competitive lead time and delivery was on time.  
施托克叶片工厂的工期更具竞争力，一贯按时交货
- All parts are shipped on site prior to the planned outage.  
所有部件在计划停工前运抵现场
- Stork has proven to be an alternative to the OEM Siemens.  
**施托克被证明有能力替代Siemens 的OEM厂商**
- Client was very pleased with Stork handling such a large project.  
客户对施托克执行这样大的项目非常满意

### Key Figures 关键数据

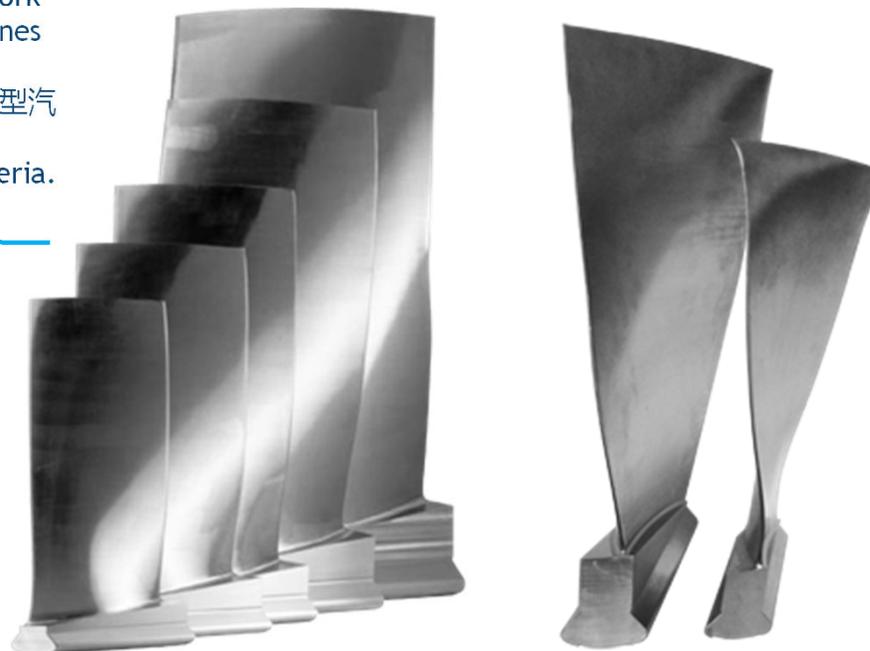
Gas Turbine 燃机  
Siemens  
V94.2

Gas turbine compressor  
Blades  
燃机冷端叶片

OEM alternative  
替代OEM产品

High quality  
高质量

6 months  
6个月工期



### 3) 美国用户：替换汽轮机叶片 (移动式扫描仪 & 逆向设计, 240只叶片, 4周制造完成)

#### End user - USA 3D Mobile scanning capability

##### Challenge 项目描述

- Mitigate down time for replacement of long lead Large Steam Turbine Blades  
缩短更换大汽轮机长叶片的停机时间

##### Solution 方案&执行

- GOM White Light Scanning System  
GOM白光扫描系统
- Portable, Mobile and Accurate  
手提移动式, 高精度
- Scan remotely  
远程扫描
- Capture 80% of Blade critical dimensions while installed or 100% disassembled from rotor  
在列80%, 分离100%的关键数据捕获率

##### Benefits 优势

- 50% reduction in manufacturing time  
**缩短了50% 的制造时间**
- 16 - 25 week lead time for forgings eliminated  
锻件16-25周的工期
- 80% of engineering work completed in advance  
80%的设计工作预先完成
- Customer received replacement parts on time to support schedule outage  
客户收到替换部件, 满足计划停工期
- Eliminated blades as critical path for the outage  
长叶片是停工期的关键
- Customer extremely satisfied with the results of the partnership  
客户非常满意于施托克的合作

##### Key Figures 关键数据

Reverse Engineering  
反向工程设计

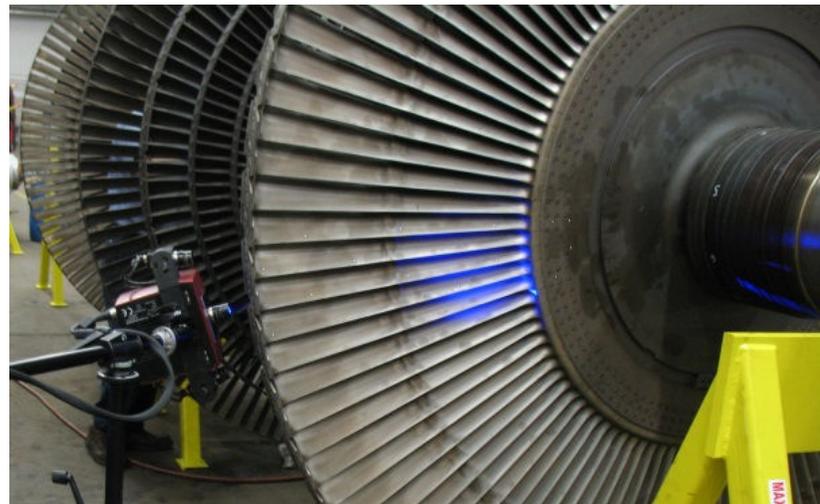
Mobile scanning  
capability  
移动扫描能力

OEM Alternative solution  
替代OEM厂商

High Quality  
高质量

240 blades  
240个叶片

4 week outage  
4周停工期



23"

## 4) 美国用户：更换汽机低压转子叶片 (逆向设计, 162只叶片, 8天制造完成)

End user - USA, Mobile Scanning assured 8 days turn time of blades

### Challenge 项目描述

- Unexpected forced outage quick repair on a complete row of LP Rotor Blades  
非计划停工, 快速维修1级低压转子叶片

### Solution 方案&执行

- Samples overnighted to Stork H&E Ithaca, NY  
样品连夜送往施托克
- GOM White Light Scanned parts  
GOM扫描部件
- Reversed Engineered and started manufacturing within 24 hours

### 反向工程设计, 24小时内开始制造

- Replacement blades shipped to customer in 8 working days  
8个工作日叶片运送至客户现场

### Benefits 优势

- Stork H&E offered the fastest delivery time with exceptional quality  
施托克快速高质量的服务
- The unit was back on line much quicker than anticipated  
机组在短期内恢复运行, 远超预期
- OEM was unable to support quick turn time  
OEM厂商无法支持快速生产周期
- Customer was delighted with delivery time and performance of Stork H&E during the forced outage  
客户对施托克在非计划停工期的表现和交货期非常满意

### Key Figures 关键数据

Reverse Engineering  
反向工程设计

OEM alternative solution  
OEM制造商替代

High Quality  
高质量

162 blades  
162个叶片

8 day turn time  
8天生产周期

Delighted Customer  
客户满意



## 5) 菲律宾用户：叶片重新优化设计和制造

End user - Philippines, Technical Verification of a rotor blade Re-design

### Challenge 项目描述

- Technical verification of a rotor blade due to problems with Eigen Frequencies.  
转子叶片本征频率问题的技术验证

### Solution 方案&执行

- Re-Engineered Rotor Blade Design.  
**转子叶片重新设计**
- FEM and Natural Frequency calculations & analysis for centrifugal loads.  
圆周载荷的有限元计算和固有频率计算
- Reversed Engineered to optimize performance.  
**反向工程设计,提高性能**

### Benefits 优势

- Design optimisation reduces vibrations.  
优化设计, 减小振动
- Increases longevity of turbine components.  
提高汽轮机部件的使用寿命
- Understanding blade behaviour in-situ.  
了解片的在位特性

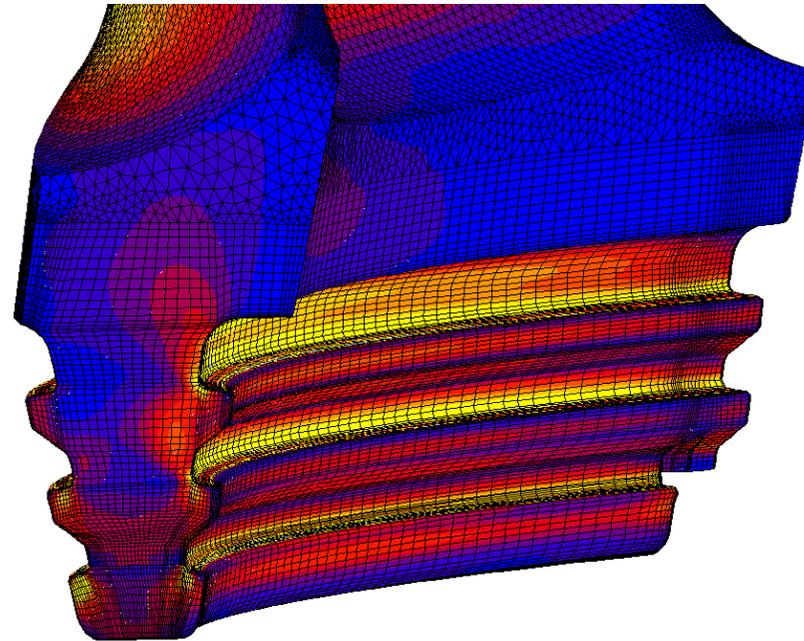
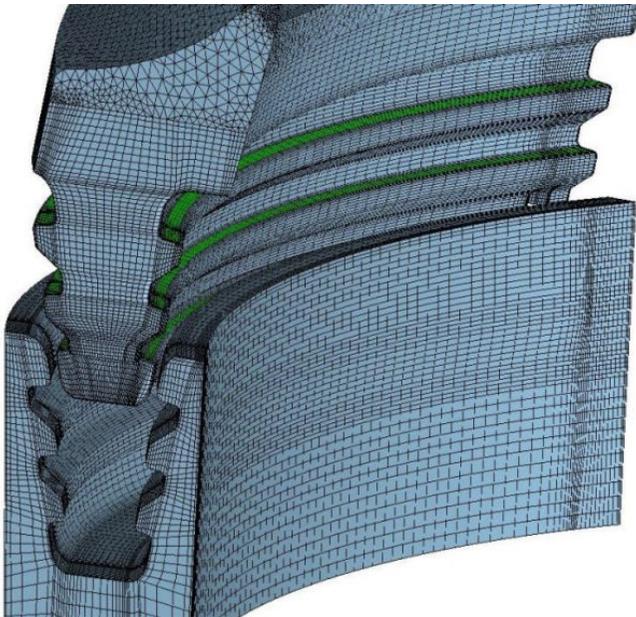
### Key Figures 关键数据

Reverse Engineering  
反向工程设计

OEM alternative solution  
OEM制造商替代

High Quality  
高质量

Optimization of design  
优化设计



## 6) 全球用户：燃机冷端/汽机叶片制造（为各燃机厂家供货或替代）

End user - globally, Innovative Stock Program - Gas Turbine Compressor

### Challenge 项目描述

- Manufacturing of Gas Turbine Components with a short lead time and exceptionally high quality.  
短期内高质量的制造燃机部件

### Solution 方案&执行

- Two Production facilities in Ithaca, USA and Sneek, Netherlands.  
荷兰和美国的两个工厂同时生产
- Quick production and global customer base.  
全球服务定位和快速响应
- In depth knowledge of Gas Turbine components.  
燃机部件的专业知识
- Reverse Engineering & Manufacturing Experts.  
反向工程设计和专业制造厂家

### Benefits 优势

- Fast delivery & shortest lead time possible.  
生产周期短, 快速供货
- Familiarity with different OEM's including but not limited to:
  - 熟悉各种OEM厂家产品, 但不限于:
  - GE Frame 3,5,6,7 & 9 通用电气
  - ABB
  - Alstom 阿尔斯通
  - Siemens 西门子
  - Westinghouse 西屋
  - & Many more



### Key Figures 关键数据

Reverse Engineering  
反向工程设计

Knowledge of OEM  
products  
OEM产品知识

High Quality  
高质量

Optimal Delivery times  
最佳的交货期

Minimum Downtime of  
turbines.  
最短的停工期

## 7) 案例：德莱赛兰蒸汽透平叶片（重新设计转子叶片）

DRESSER RAND STEAM TURBINE BLADES: ROTOR BLADE RE-DESIGN WITHIN A CHALLENGING LEADTIME

### SCOPE服务范围

Customer 客户	Maintenance Partners Belgium NV
Country 国家	Belgium比利时
Customer Type客户类型	Independant Service Provider (ISP)独立服务提供商
OEM / Machine Type 原产商/设备型号	Tuthill (Dresser-Rand) Tuthill (德莱赛兰)
Output (MW)输出功率 (MW)	11
Project Type 项目类型	Reverse Engineering & Manufacturing 逆向工程与制造
Project Lead Time 供货期	12 Weeks 12周
Product 产品	Rotor Blades Stages 01-07 转子叶片01-07级
Material(s)材料	X22CrMoV12-1 (W-no. 1.4923)



Severely damaged stage six 严重损坏的第六级、第七级叶片

### FACTS技术特点

- Re-design of stages six and seven in close co-operation with customer.

与客户密切合作，重新设计第六级和第七级叶片。

- Re-design for all blades, closing blades & pieces and counter-balance parts.

为所有叶片重新设计、闭合叶片和部件以及平衡块。

- Brazed Stellite Grade six erosion shield replaced by laser hardening.

用激光硬化处理来代替钎焊钨铬钴合金六级腐蚀防护层。

In 2015, Maintenance Partners Belgium awarded Stork Turbo Blading for the supply of seven stages steam turbine rotor blades.

The blades were required for a project in which Maintenance Partners overhauled a Tuthill steam turbine rotor for a European customer in the chemical industry. The rotor, and especially the blades, suffered severe damage due to an error which led to the generator operating as a driver for a certain period of time.

2015年，施托克透平叶片制造公司很荣幸地收到比利时维修合作伙伴的委托，提供（多套）7级透平转子叶片。

该合作伙伴的一家欧洲化学工业客户有一台Tuthill蒸汽透平，由于一次失误，导致发电机驱动透平运行了一段时间，造成转子，尤其是叶片，受到了严重损坏而需要大修。施托克透平叶片公司正是为该大修项目供应替换叶片。

Maintenance Partners accepted a challenging overall turnaround time for the project which in turn resulted in a similarly challenging lead time for supply of the blades by Stork Turbo Blading.

Stork Turbo Blading supplied all seven rows of blades within the agreed timeframe, where stages six and seven needed a partial redesign. Therefore, responsive and immediate communication between the two companies ensured that the whole project was a success from start to finish.

这个大修项目要求我们合作伙伴的周转期非常短，因此施托克叶片制造公司的供货期也非常紧急。

施托克透平叶片公司不但需要为这个项目提供七排全套的叶片，而且还要对第六级和第七级还需要部分重新设计，体现了我们制造之外的技术设计实力。通过快速响应和及时沟通，项目执行非常顺畅和成功。



Newly manufactured and assembled stage six  
重新制造和组装的第六级叶片组



Rotor overview with newly manufactured  
blades fitted 新叶片装配后的转子

