HMC – 3 and its Role

in

PAK – CERN Collaboration

By

Abdul Hai, Project Director, HMC-3

This Presentation shall cover the following:

- A brief Description of HMC-3.
- Collaboration between Pakistan & CERN.
- Contributions of HMC-3 in the Collaboration.

A Project of

State Engineering Corporation of Pakistan

Heavy Mechanical Complex - 3

- Known as HMC – 3.

- It is one of the largest industrial projects in the heavy engineering sector of Pakistan.

HMC – 3 is established to

Design

&

Manufacture

Mechanical Equipment

for

Medium and Heavy Industries

in accordance with the

International Codes and Standards.

There is no doubt that
other heavy Industrial Projects
of Pakistan
do not have the following:

- **A fully computerized Design Set up.**
- **Complete line of CNC Based Manufacturing Facilities.**
- **Comprehensive NDT Testing Facilities.**

That is WHY

HMC-3 is playing an important role in

self-reliance, indigenization and import substitution of

fabrication based heavy mechanical equipment, complex & high tech components and sophisticated parts.

DESIGN , ENGINEERING AND DEVELOPMENT

HMC-3 capabilities are of international level that are supported by the latest software & IT.

Standards & Codes

The following international Standards and Codes are used as per clients needs:

* **ASME**
* **GB**
* **AISC**
* **AWS**
* **TEMA**
* **DIN**
* **FEM**
* **HEDH**

Quality Management System

HMC-3 is
ISO 9001-2000
Certified for
Design & Manufacturing
of Engineering Products
for Heavy and Medium
Industries
by:

1. **UKAS, England**
2. **PNAC, Pakistan**

CERTIFICATE OF REGISTRATION

MOODY INTERNATIONAL CERTIFICATION

This is to certify that the Quality Management Systems of:

HEAVY MECHANICAL COMPLEX - 3
(TEXILA - PAKISTAN)

have been assessed and registered against the following quality assurance standard/s:

BS EN ISO 9001 : 1994

The scope of the registration:

DESIGN AND MANUFACTURING OF PROCESS AND MECHANICAL EQUIPMENTS FOR MEDIUM AND HEAVY INDUSTRIES AND ENGINEERING SECTORS.

Certificate Number : 0001074

Date of Issue : 15th April 2003
Valid Until : 14th April 2006

UKAS QUALITY MANAGEMENT
Registration Number 014

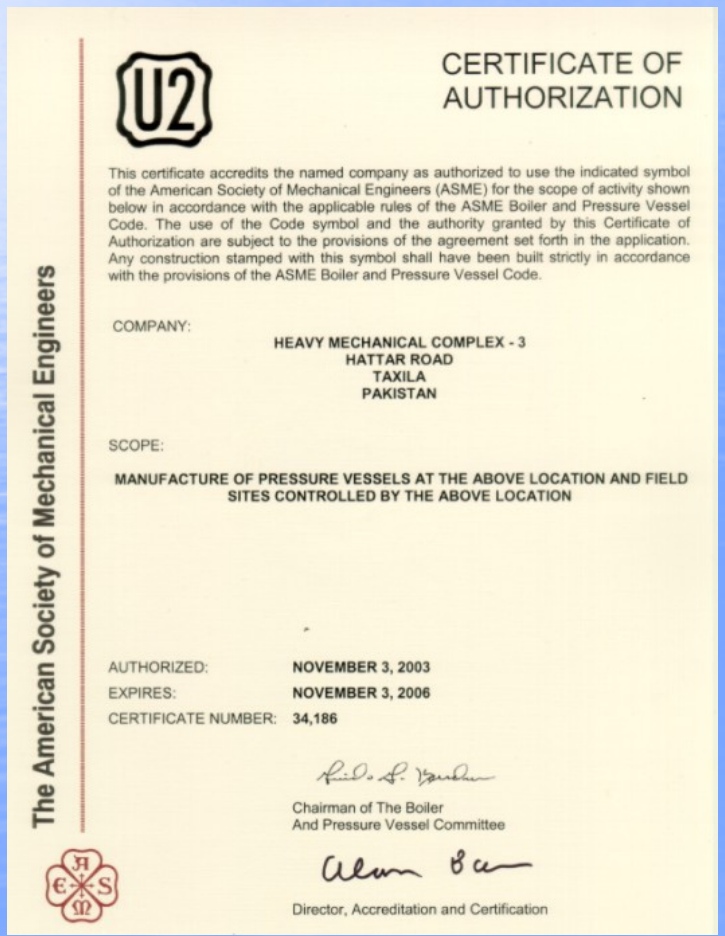
Signed for and on behalf of Moody International Certification Limited

The Lord McNally Chairman

This is not a legal document and cannot be used as such. The use of the Accreditation Mark indicates accreditation in respect of those activities covered by the Accreditation Certificate 014. The certificate remains the property of Moody International Certification Limited to whom it must be returned on request.

Product Certification

HMC-3 is authorized to use the symbols of U & U2 of American Society of Mechanical Engineers for manufacturing Pressure Vessels.



The American Society of Mechanical Engineers

U2

CERTIFICATE OF AUTHORIZATION

This certificate accredits the named company as authorized to use the indicated symbol of the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the Code symbol and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this symbol shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

HEAVY MECHANICAL COMPLEX - 3
HATTAR ROAD
TAXILA
PAKISTAN

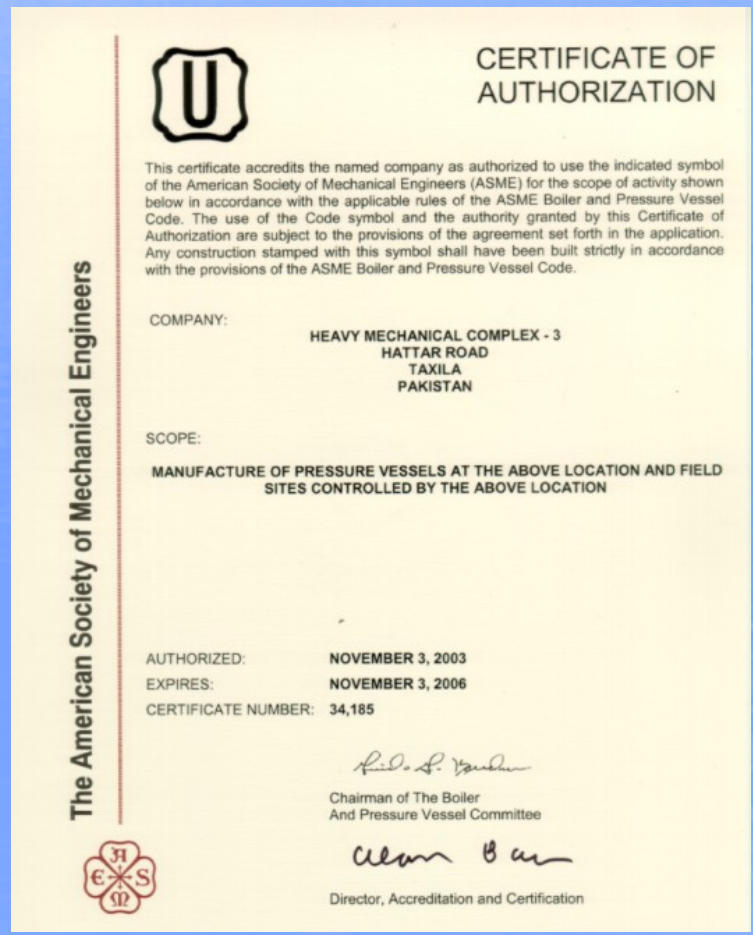
SCOPE:

MANUFACTURE OF PRESSURE VESSELS AT THE ABOVE LOCATION AND FIELD SITES CONTROLLED BY THE ABOVE LOCATION

AUTHORIZED: NOVEMBER 3, 2003
EXPIRES: NOVEMBER 3, 2006
CERTIFICATE NUMBER: 34,186

Chairman of The Boiler
And Pressure Vessel Committee

Director, Accreditation and Certification



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Product Certification

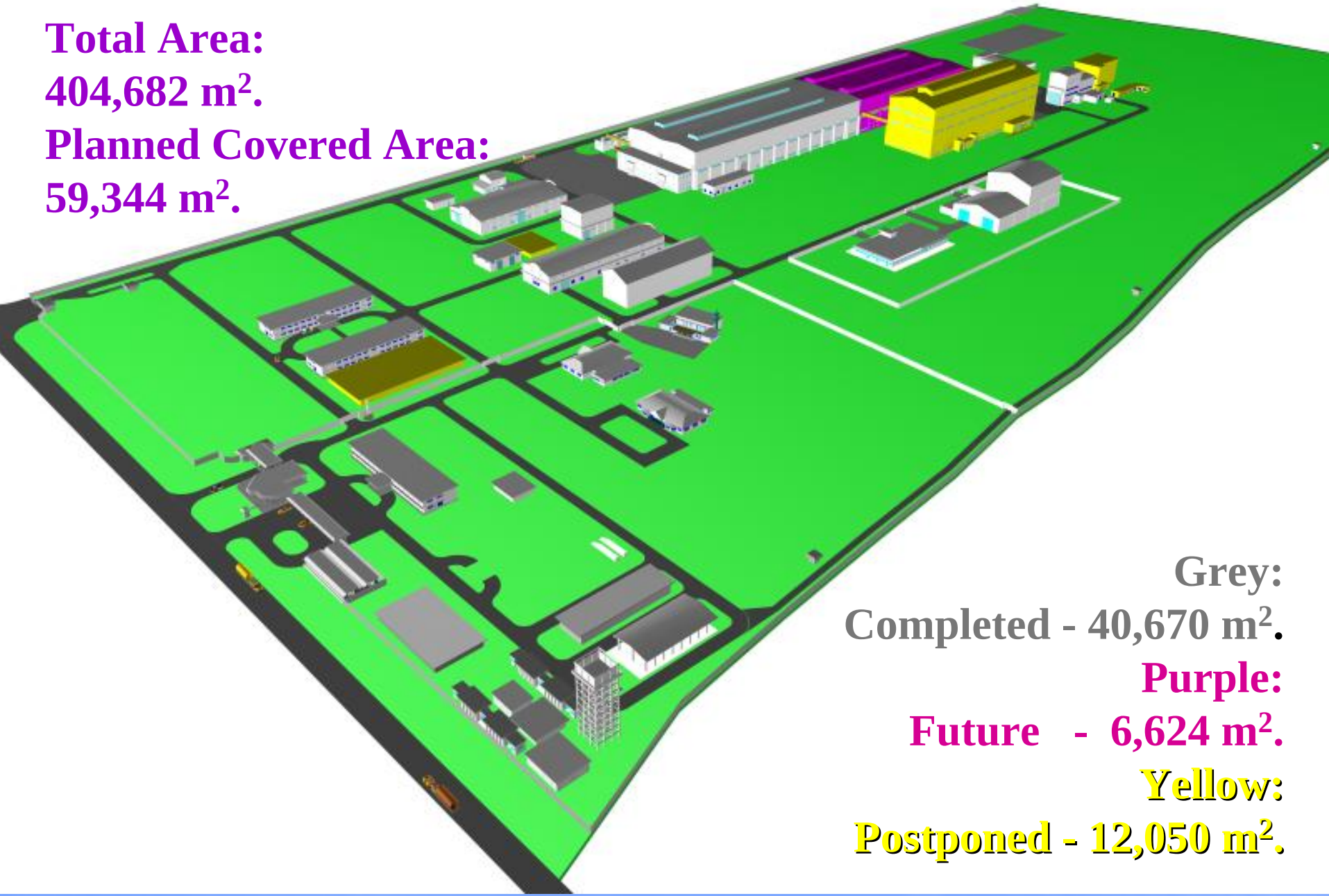
- **HMC-3 is also certified by the Federal Boiler & Pressure Vessel Board of Pakistan to manufacture Boilers and Pressure Vessels.**

- **HMC-3 is in the process of acquiring:**

1. **API Certification.**
2. **PNRA Certification.**

HMC-3 PROJECT LAYOUT

Total Area:
404,682 m².
Planned Covered Area:
59,344 m².



Grey:
Completed - 40,670 m².
Purple:
Future - 6,624 m².
Yellow:
Postponed - 12,050 m².

Manufacturing Works

HMC-3 Project comprises of following:

- **Heavy Vessel Workshop**

  equipped with Electrical Overhead Cranes up to 150 Ton having height under hook 13 m.

- **Light Fabrication Shop**
- **30m long Annealing Furnace**
- **High Pressure & Temperature Test Loop**
- **Auxiliary Buildings**

In Pakistan, only HMC-3

has the heaviest fabrication based manufacturing facilities, such as:

Plasma Cutting Machine

Cutting Thickness:
up to 70 mm in SS.
Up to 45 mm in Al.
Plate Size: 4 x 12 m.

Plate Edge Planning Machine

Thickness: to 250 mm.
Length: up to 12,000 mm.
Rotation Angle:35°.

CNC Bending & Rolling Machines

Plate Thickness:
Up to 120mm(cold) & 250mm (hot).

Bending Accuracy
± 0.2% x diameter.

CNC Dish Making Line

Dish End Dia:
Up to 4,000mm.
Plate Thickness:
Up to 20mm CS
& 16mm SS.

Narrow Gap Welding Station

Working Range:
8m in Horizontal & Vertical Planes.
Welding: Up to 350mm thick steel plates.

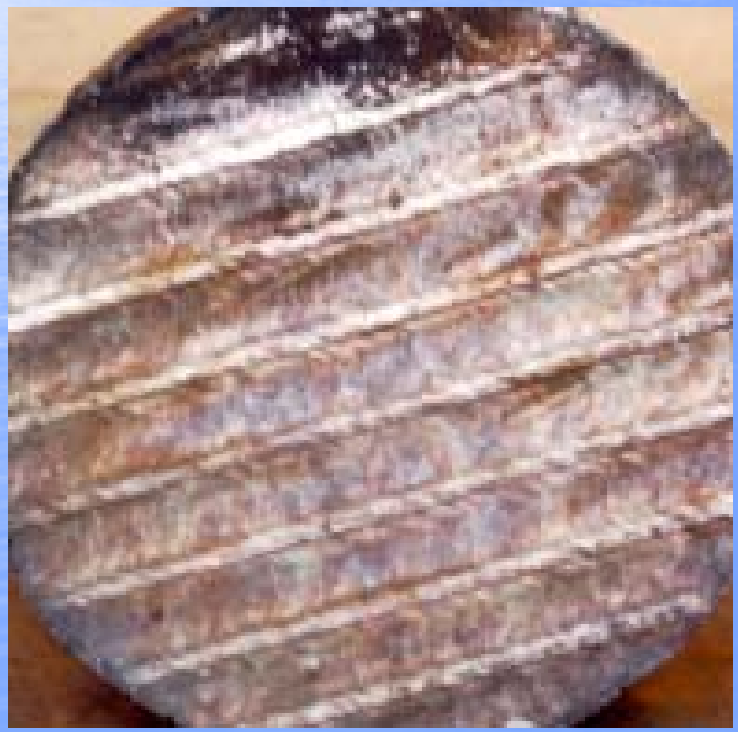
Submerged Arc Welding (SAW) with

Column & Boom Type Machines of 6m range in Horizontal and Vertical planes.
Welding: Up to 100mm thick steel plates.

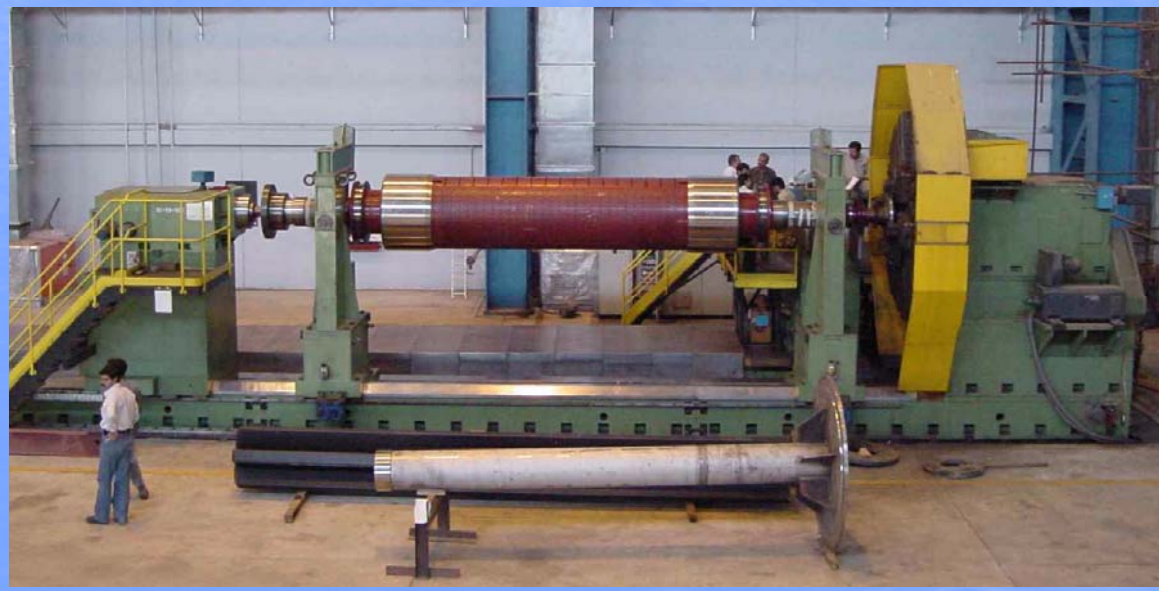
Submerged Arc Strip Cladding

Job Dia:
106-8,000mm

Job Length:
Up to 24m.



CNC Machine Tools to machine heavy jobs up to weight of 320 tons, dia 16m, length 12m and height 6.5m.



30 m Annealing Furnace

30 m Length (15 + 15 m)

Job of maximum dia 6 m & length 28.5 m.

Loading capacity up to 600 tons.

Max. Temp. 950 ^{0}C for full Furnace and 1050 ^{0}C for half Furnace.

High Pressure & Temperature Test Loop

Pressure:15.2 Mpa

Temperature:
300 ^{O}C

Flow Rate:
340 m^3 / hour

Size of Test Section:
6 x 3 x 18 m

Maximum Loading:
20 tons

QUALITY ASSURANCE

Foreign Trained Engineers

plan and supervise

the checking & recording of

QA & QC Activities

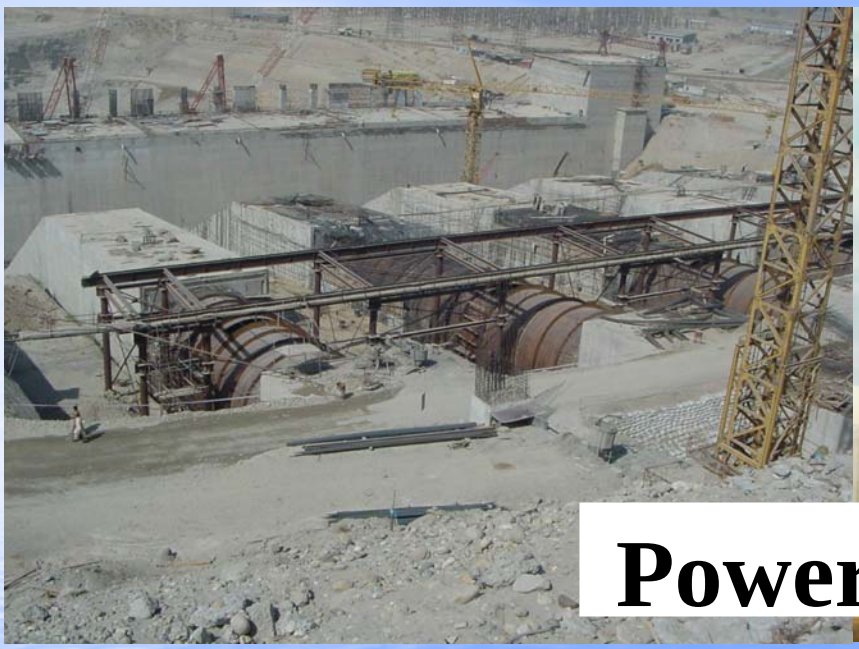
for all the manufacturing steps

right from material purchase till deliver

through

- **Quality Management System &**
- **Inspection and Testing**

The Sectors served by HMC-3 are as under:

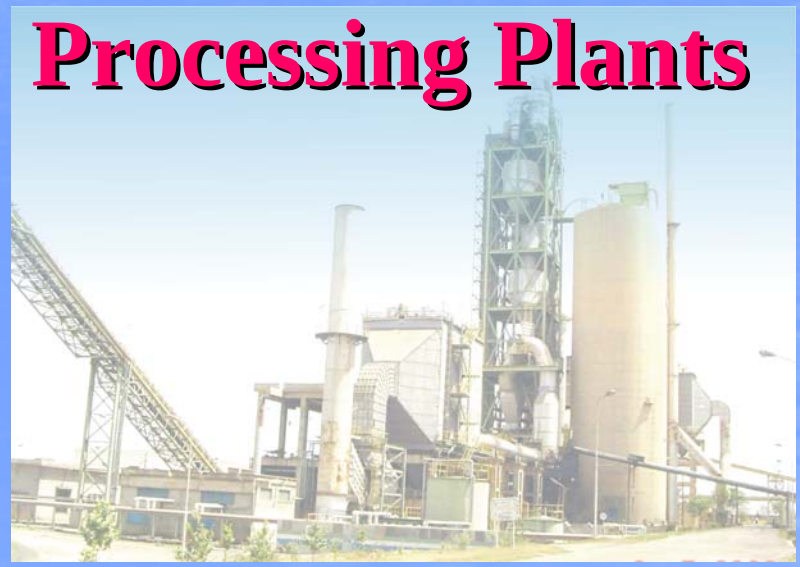


Power Plants

Industrial Projects

Chemical and Petrochemical Plants

Processing Plants



COLLABORATION

between

PAKISTAN & CERN

- In 1994, a Protocol was signed between CERN and Govt. of Pakistan.
- In 1997 CERN & PAEC signed a Protocol for supply of Steel Supports for four Outer Rings of CMS.
- In 1998 CERN & PAEC signed a Memorandum of Understanding for collaboration in the construction of Magnet Support.

- This Protocol and Memorandum of Understanding opened doors for wide range of possibilities of cooperation between CERN & PAEC.
- In July 2003 CERN & PAEC signed a Protocol where by Pakistan will contribute in-kind western value of US$ 10 millions.

- In October 2003 a Letter of Intent was signed for the following items at a price of CHF 1.36 millions that shall be paid by ATLAS.

Mini-Van, **1 + 3 Nos.,**	**1.5 Ton per piece**
Truck Lifting Tool, **1 No.,**	**1.0 Ton**
Truck Column Lifting Tool, **2 Nos.,**	**1.0 Ton per piece**
Calorimeter X- Bracket, **16 Nos.,**	**300 Kg per piece**
JD Ring / Shim,	**28.76 Tons**
JD Lead.,	**6.4 Tons**

CONTD.

JD Ribs,	6.6 Tons
JD Tubes, 2 Nos.,	11.2 Tons
JF Lifting Frame,	2.5 Tons
ATLAS Gas System Piping	
ATLAS Cooling System Piping & Installation	
Bracket for Platform Supports,	3.3 Tons
MDT Big Wheel,	1 Lot

Contribution of HMC-3

in the

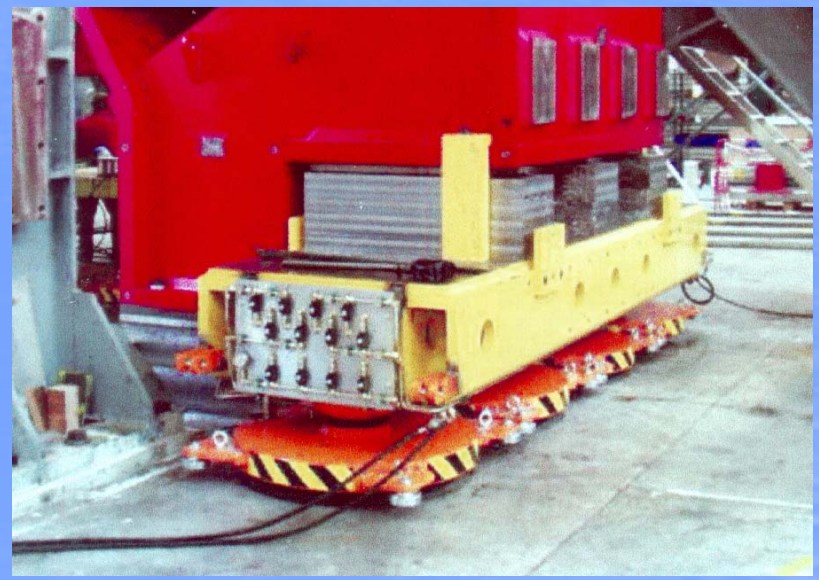
PAKISTAN – CERN

COLLABORATION

SOME JOBS Delivered by HMC-3

- CMS — Value in CHF
  - 8 Magnet Supports — 224 tons — 0.625
  - 2 Transport Beams — 21 ton — 0.080
  - 8 Raisers — 118 tons — 0.180
- ATLAS — Value in US $
  - 1 Pair each, BS & EBS — 45 tons — 0.278
  - 4 Sets Back Cryostat — 06 tons — 0.027

Magnet Support (28.5 Tons)&
Transport Beam (10.5 Ton)

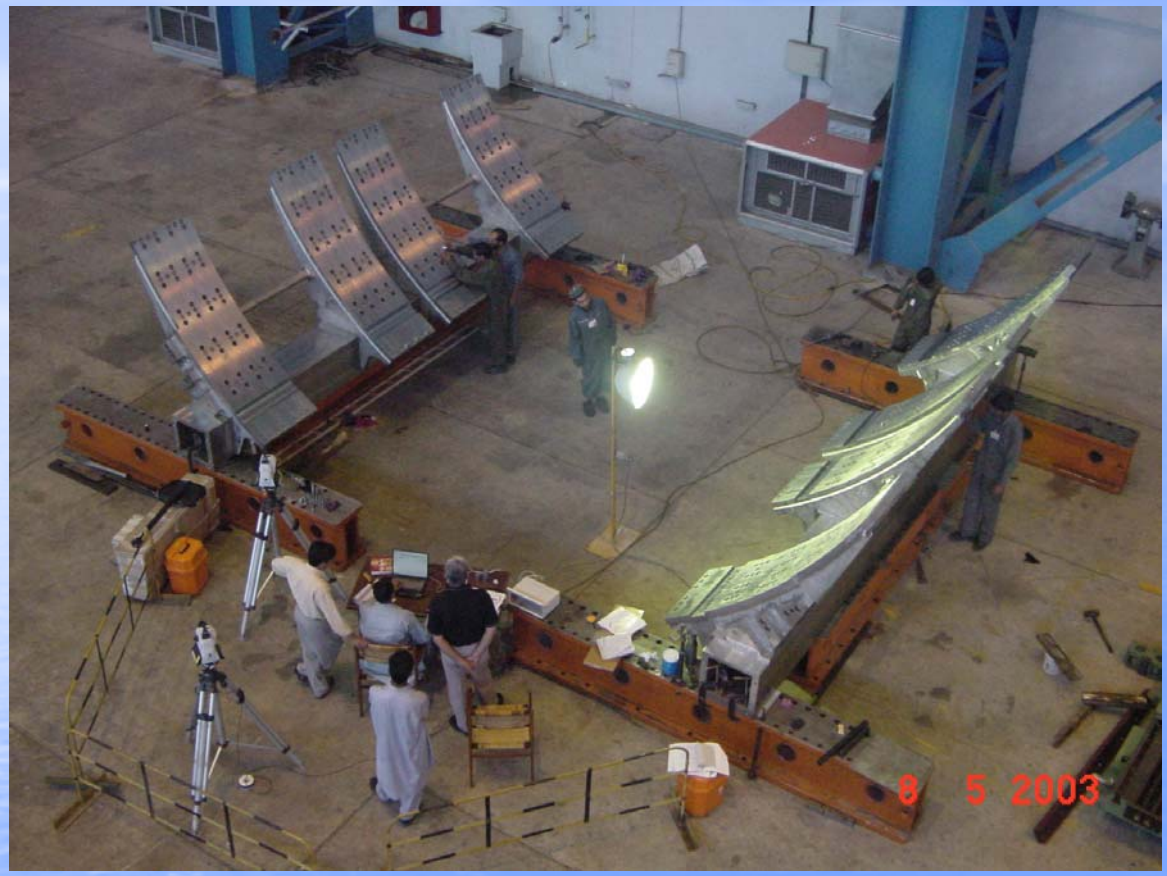


Magnet Support under installation

Raiser (14.5 Tons)

Raisers under Inspection

Saddle and Box Beam for Barrel and Extended Barrel



Barrel Support (26.5 Tons)

Extended Barrel Support (15.7 Tons)
with Back Cryostat Plate (1.5 Tons)

Barrel Supports under installation at
CERN, Switzerland

Mini Van


THANK YOU