



INTRODUCTION TO KHPT CO., LTD.

REVAMPING & CONSTRUCTION DIVISION



■ Scope of Replacement Work:

1) Reactor

- Cyclone inlet ducts between the internal riser chambers and cyclones
- Chamber shell
- Riser baffles
- Nozzles and internal piping (equalizer, catalyst filling, withdrawal nozzle, vacuum & aeration nozzle)

2) Regenerator

- Cyclone chamber, dip legs and flapper valve
- Combustor
- Nozzle and distributor

3) Catalyst Line

- Nozzles
- Standpipe
- Slide valve
- Expansion joint
- Hydraulic unit



Existing Expansion Joint Line
under Disassembling



Catalyst Standpipe on Installation



Handling of Transfer Nozzle



Transfer Nozzle under Installation

The Details of Recent Experience for Revamping Work <RFCC>

2. S-OIL RFCC

The plant had its refining capacity increased up to 210,000 from 200,000 barrels per stream day (BPSD), through this revamping work. KHPT had successfully completed revamping works for RFCC Reactor Revamp Package and MHC Revamping Package.

1. RFCC Reactor Revamp Package

■ Revamping Period: Sep.1, 2016 ~ Oct.31, 2016

■ Scope of Replacement Work:

- 1) Reactor
- 2) Catalyst cooler bottom head
- 3) Vapor line/Spent catalyst line
- 4) Plug valve and Catalyst slide valve



Loading of Old Reactor



RX Stripper Packing on Install.

New Reactor on Installation



Install. of New Cooler B/H



Install. of New Spent Line



New Plug Valve Replaced

2. MHC Revamping Package

■ Revamping Period: Sep.1, 2016 ~ Oct.31, 2016

■ Scope of Replacement Work:

1) Drier

- Trays
- Nozzles modification and Installation new nozzles
- Installation of gravity distributor, schoepentoeter and platform & ladder

2) Hot Separator Drum

- Ladders
- Skirt welding
- Nozzles modification and installation of schoepentoeter

3) Cold Separator Drum

- Nozzles modification
- Installation of schoepentoeter



MHC Revamping Site



Schoepentoeter on Assembling



Nozzle on Modification



Tray under Installation

The Details of Recent Experience for Revamping Work <Vacuum Distillation Unit>

3. Reliance Vacuum Distillation Unit

All the revamping works referred to below were scheduled to be completed within 20 days of shut down period on contract. However, KHPT completed this project within 18 days with approx.120 local workers, 80 Korean engineers, supervisors and workers.

■ Revamping Period: Nov. 2004 ~ Dec. 2004(60 days)

■ Scope of Replacement Work:

- Vacuum transfer line(VTL) between the 100"/80"(new/existing) nozzle of the vacuum column and the 10" nozzle of vacuum heater radiant coil outlet.
- Schopentoeter after removing vapor horn.
- New 100" nozzle on the vacuum column.
- Pipe supports, springs, snubbers, sway braces etc.68
- Covering of column shell after removing 80" nozzle.



Installation of Schopentoeter



Installation of Schopentoeter



Overall View of Reliance VDU



VTL under Installation

The Details of Recent Experience for Revamping Work <Vacuum Distillation Unit>

4. Petronas Vacuum Distillation Unit

KHPT has successfully carried out this revamping work for Vacuum Distillation Unit in Melaka Refinery PSR2 project, requiring 3 months of preparatory step.

■ Revamping Period: Oct.2009 ~ Feb. 2010

■ Scope of Replacement Work:

- Nozzles in the vacuum column.
- New inlet Horn support points and wear plates to the shell by welding in the vacuum column.
- New VTL(Vacuum Transfer Line)
- Shell stiffening columns onto the Vacuum Column.



Preparation for Installing New VTL



Preparation for Installing New VTL



The Details of Recent Experience for Revamping Work <NCC>

8. SAMSUNG/HANHWA TOTAL NCC

Regarding NCC(Naphtha Cracking Center), overhaul works of 2014 & 2015 respectively were carried out successfully. The work period & the scope of work are as follows.

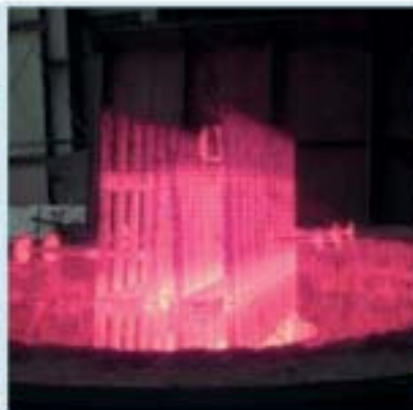
■ Work Period: Apr.8, 2014 ~ Dec.31, 2014 and Mar.28, 2015 ~ Aug.31, 2015

■ Scope of Revamping Work:

1. Replacement works of coils for #109, 110 & 111 cracking heater (2014)
2. Replacement works of coils for #103, 105,108, & 112 cracking heater (2015)
3. Modification and replacement works for the following items
 - 1) Utility Lines, Steam drum accessories, Fuel gas lines
 - 2) TLE(Transfer Line Exchanger), Desuper Heater accessories
 - 3) Wall Buner & hearth burner tip, Decocking nozzle, X-over piping & wire rope
 - 4) Painting, Refractory and Insulation etc.



Inlet Manifold Assembled



Material on Heat Treatment



Lifting of New Coil Bundle



Y-Fittings Cut



New Coil on Installation



Bottom TLE on Repair Work

The Details of Recent Experience for Revamping Work <Rehabilitation of Fired Damage>

10. S-Oil No.2 Crude Column

All the rehabilitation works referred to below were scheduled to be completed within 38 days of shut down period on contract. However, this project was completed within 31 days.

■ Revamping Period: Apr. 1993 ~ Jun. 1993
(63 days)

■ Scope of Work:

- 1) Material procurement of crude column
- 2) Replacement with new material
 - Upper and lower shell.
 - Various internals.
 - New various nozzles.
 - Reinforcing rings and ribs
- 3) Correction to verticalness of crude column



Overall View of S-Oil No.2 Crude Column



One of the Declined Parts



No.2 Crude Column on Revamping Work

The Details of Recent Experience for Field Fabrication & Installation Work <RFCC Reactor, Regenerator & Main Column etc.>

14. CPC RFCC

This project requires, at an earlier stage rather than when installation starts, the settlement for ranges between shop and field fabrication per column/ reactor/ regenerator respectively and was successfully carried out.

■ Work Period: Feb. 1999~ Oct. 2000

■ Scope of Work:

- Design
- Material procurement & Fabrication
- Installation
- Inspection
- Precommissioning

■ Work Volume

- Column: 1,050 ton
- Reactor: 510 ton
- Regenerator: 1,100 ton



CPC RFCC Installation Site



Upper Part of Regenerator



Installation of Reactor



Fractionator on Installation

The Details of Recent Experience for Installation Work <Nickel Refinery Plant>

16. Ambatovy Nickel Refinery Plant

KHPT was awarded part of Ambatovy Nickel Refinery Plant in Madagascar(Africa) as a mechanical construction contractor. This plant is well known to be the biggest and most important in Madagascar with expected product of 60,000 tons of Nickel Ingot/year, when to be operating. KHPT successfully performed the installation/commissioning work for over 5,000 tons of equipment, steel structures and piping, including Hydrogen Reformers and Air separation plant which requires higher degree of precision in assembly and installation work within the comparatively strict construction period.

■ Work Period: April. 2008 ~ Nov. 2010

■ Scope of Work:

1) Material procurement and shop fabrication

- Piping Fabrication

2) Installation & Inspection

- Equipment, piping and steel structure

3) Commissioning

■ Work Volume

- Equipment: 4,300 ton

- Piping: 1,730 ton

- Steel Structure: 1,980 ton



Cold Box on installation



Installation of Reformer



Nickel Refinery Plant Site

The Details of Recent Experience for Installation Work <Piping & Gas Duct and belt conveyor >

4. Hyundai Steel the third unit

This experience is for three(3) projects which KHPT was awarded separately. They are package#1 piping work, duct work and belt conveyor work in "Hyundai Steel the third unit".

■ Work Period (Piping & Duct / Conveyor): Nov. 2011 ~ Sep. 2013 / Feb. 2012 ~ Dec. 2013

■ Scope of Work:

1) Material procurement and fabrication

- Piping
- Gas duct

2) Installation

- Piping, duct and belt conveyor

3) Commissioning

■ Work Volume

- Piping / steel structure: 371,000 dia.-Inch /1,432 tons
- Duct: 10,105 tons
- Conveyor: 22,500 tons

