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# Revamping FCC Unit



*Industrial Montaj Achievement*

*Dec 08 – Feb 09*





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## General information :

- Construction year of the FCC Unit: 1980
- Construction made under UOP license.
- Inside units:
  - Riser exterior and interior / Striper / 6 Cyclone / Reactor / catalyst regenerator / CO Boiler.

The client chose **Industrial Montaj** for the following works:

- Removal of the external riser
- Removal of the cyclone and the internal riser
- Removal of the ferrule from the striper
- Replacement of the support sustaining the striper

*In parallel Industrial Montaj was in charge for all the mechanicals works in FCC Unit during the shutdown.*

- *Isometric piping*
- *Heat exchanger (extraction & washing) and columns*
- *Erection of static equipment and 4 hydraulic valves. (Tapco )*







## Natura lucrarilor efectuate:

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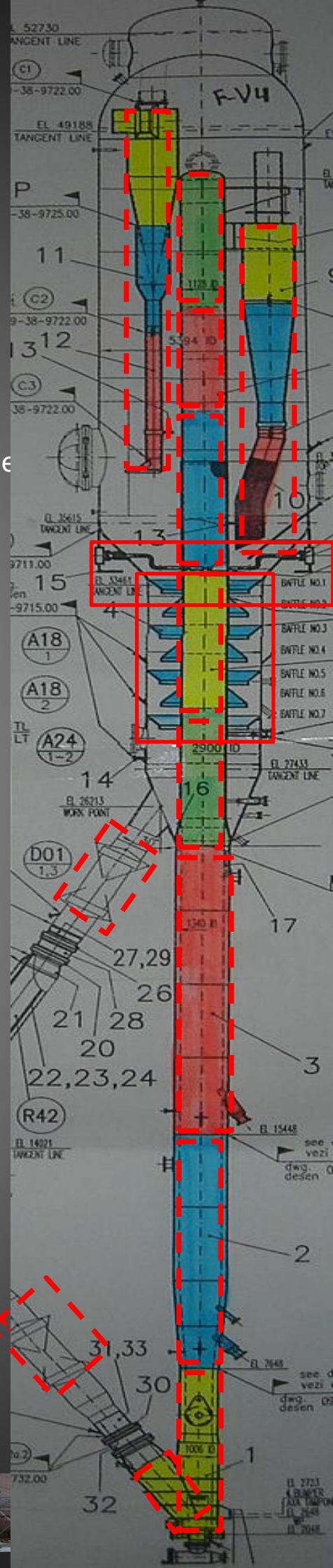
- Dismantle of the external riser.
- Dismantle cyclones in the reactor
- Dismantle internal riser.
- Dismantle 2 valves for the catalyst connection.
  
- Preparation of the surface inside the reactor and inside the stripper (interior + exterior) for the X ray examination.
- Erosion and corrosion Control
  
- Erection of new internal riser.
- Erection of the new baffles.
- Erection of the new external riser + 7 optimix.
- Erection of the new cyclone.
- Erection of 2 valves for catalyst (DN 800)
- Prefabrication and erection for all isometric piping + erection all the piping support.
- Changing the support element for the reactor

### -Complementary works:

- Modification and consolidation metallic structure (30 T)
- Erection of pipe for CO Boiler DN 2000
- Replacement of hydraulic valves for :
  - Catalyst fines separator entry DN1200
  - Catalyst fines separator exit with 2 outputs (DN1300)

### All works represent a total amount of:

- 105 to dismantled
- 169 to erected
- 60 000 working hours in winter conditions.





## Etapa de demontare

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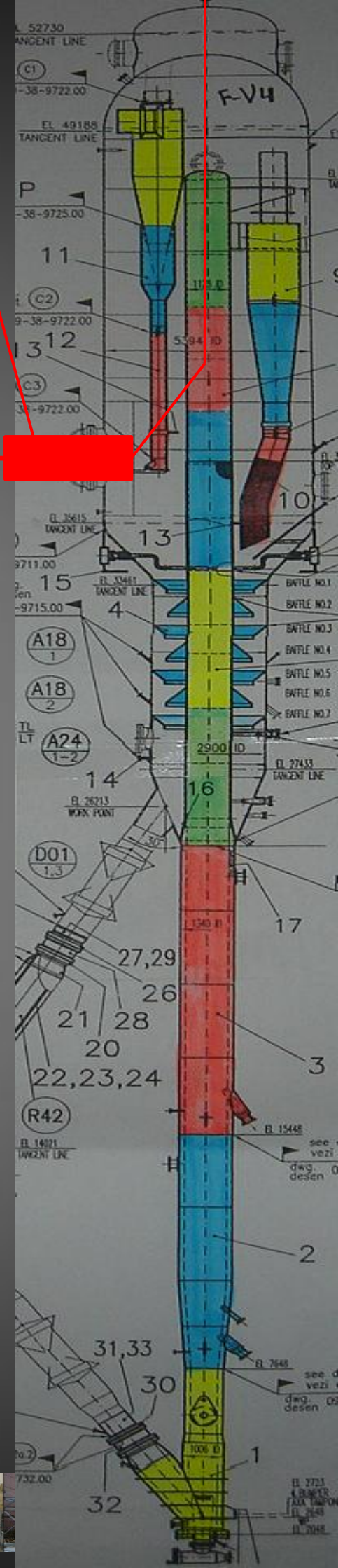
Our main difficulty was to dismantle the internal riser and the cyclones inside the reactor. **WHY ?**

***ALL THE OPERATION  
WAS DONE WITHOUT OPENING  
THE TOP OF THE REACTOR.***

For this operation, engineers from Industrial Montaj proposed and implemented the following solution :

- Calculating the size of each element dismantled according to the manhole diameter situated at 35 m.(DN 2000)
- Positioning of the arm of a crane on the top of the reactor (55 m) allowing the element to be stabilized on a vertical position.
- Each element was brought down to the manhole.
- With a manual crane system placed at the level of the manhole, each section was positioned horizontally.
- A second crane (35 m high), took out of the reactor all elements through the manhole.

***A total of 32 elements and 14 baffles  
were dismantled inside + 4 elements  
from external riser.***











The new internal elements were erected through the same method used for dismantling...

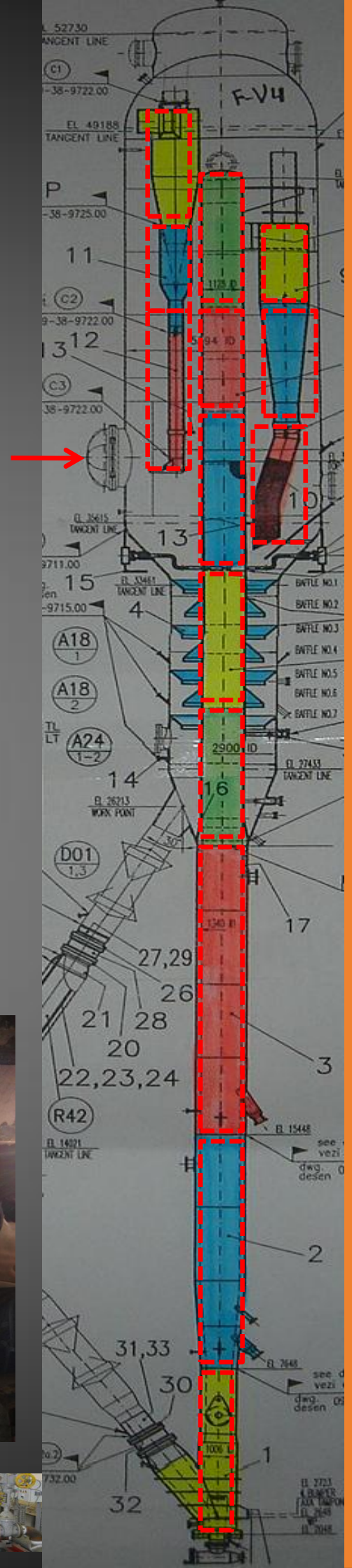
All 42 elements through the manhole.

The external riser made of 3 sections, was erected from the ground point to the its top using 3 manual cranes.

90 weldings of 13 to 50 mm thickness were done for the revamping of this reactor.

All weldings were controlled with penetrant liquide, US and X ray.

A heat treatment was done to all weldings, using our intern equipment.





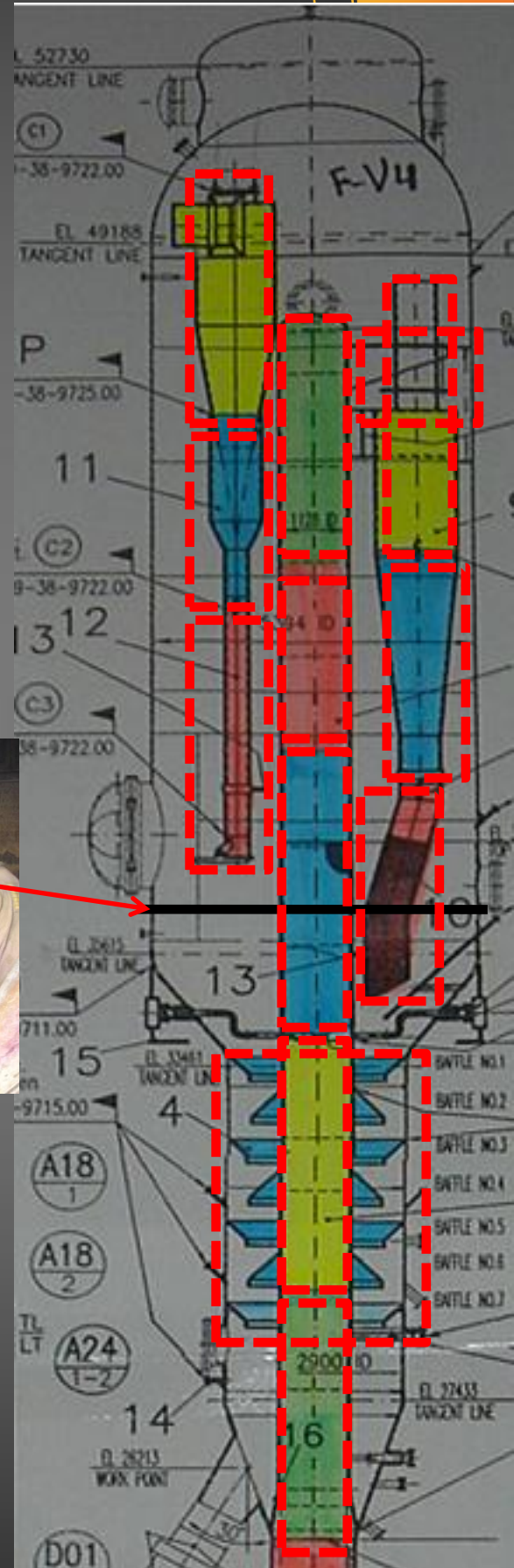
## Internal erection stages.

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- Inserting and welding the 1st riser's element.
- Erecting the baffles on the riser's wall.
- Inserting the 2nd riser's element and welding the baffles to it.
- Welding the 2nd element to the 1st one.
- Erecting the 1st element of the 3 cyclones placed at the second level.
- Building a temporary storage platform for the 5th riser's section + the 3 elements of the cyclones from the 1<sup>st</sup> level.



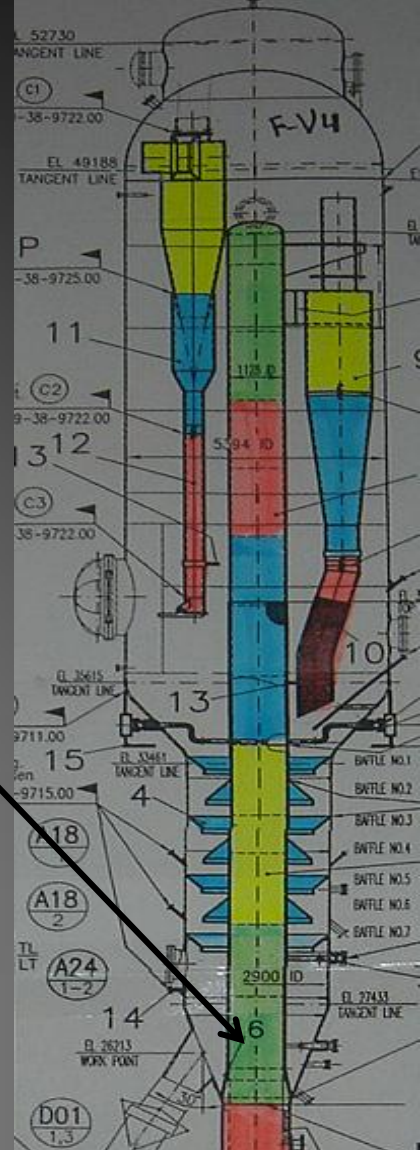
- Erecting the elements 3,4 and 5 of the riser
- Erecting 3 supports of the 1<sup>st</sup> level cyclone
- Erecting the 1<sup>st</sup> elem. of the 3 cyclones from the 1<sup>st</sup> level.
- Inserting and erecting the 2<sup>nd</sup> and 3<sup>rd</sup> element of the 6 cyclones.







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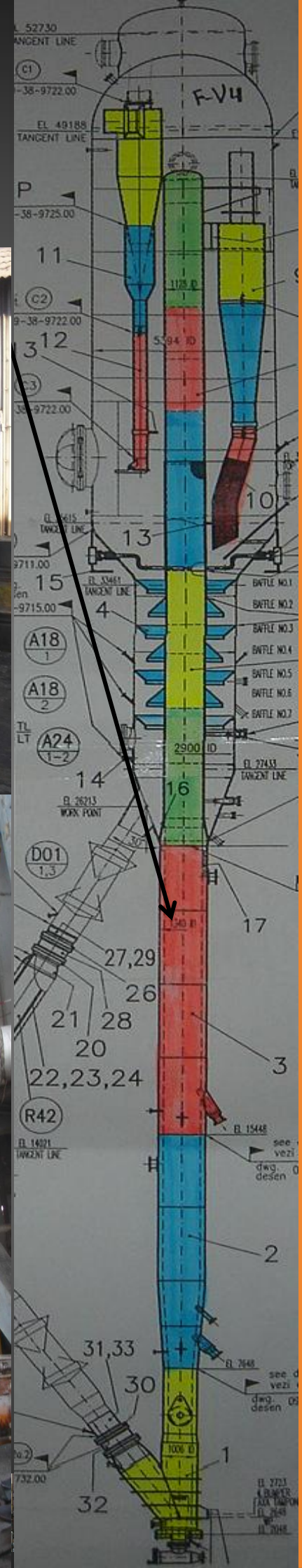




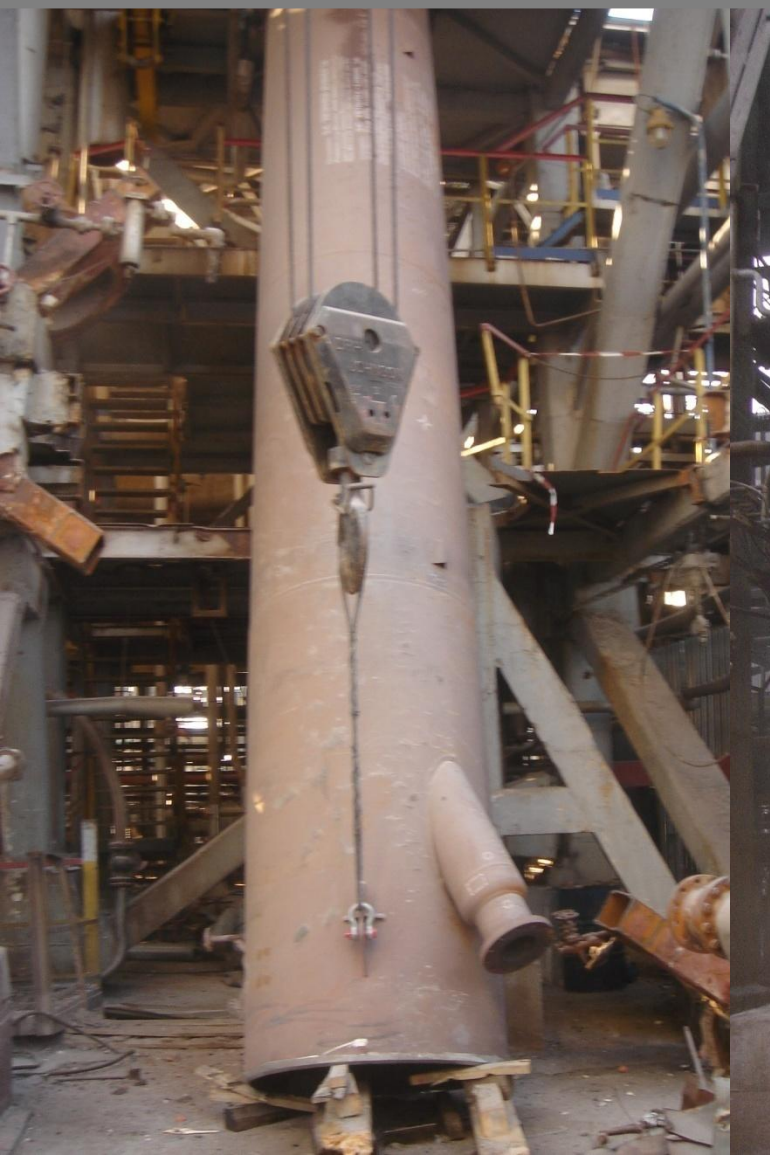
Few photos:

## Erection of the 1<sup>st</sup> external riser element

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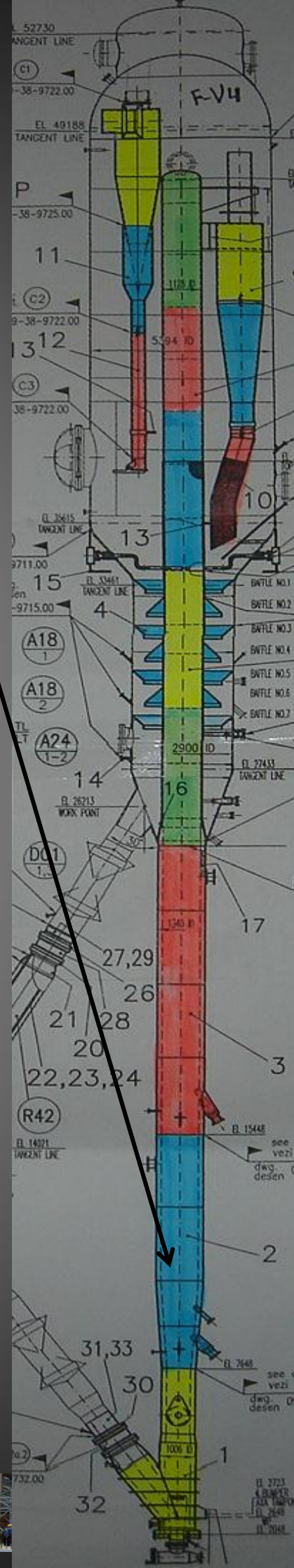




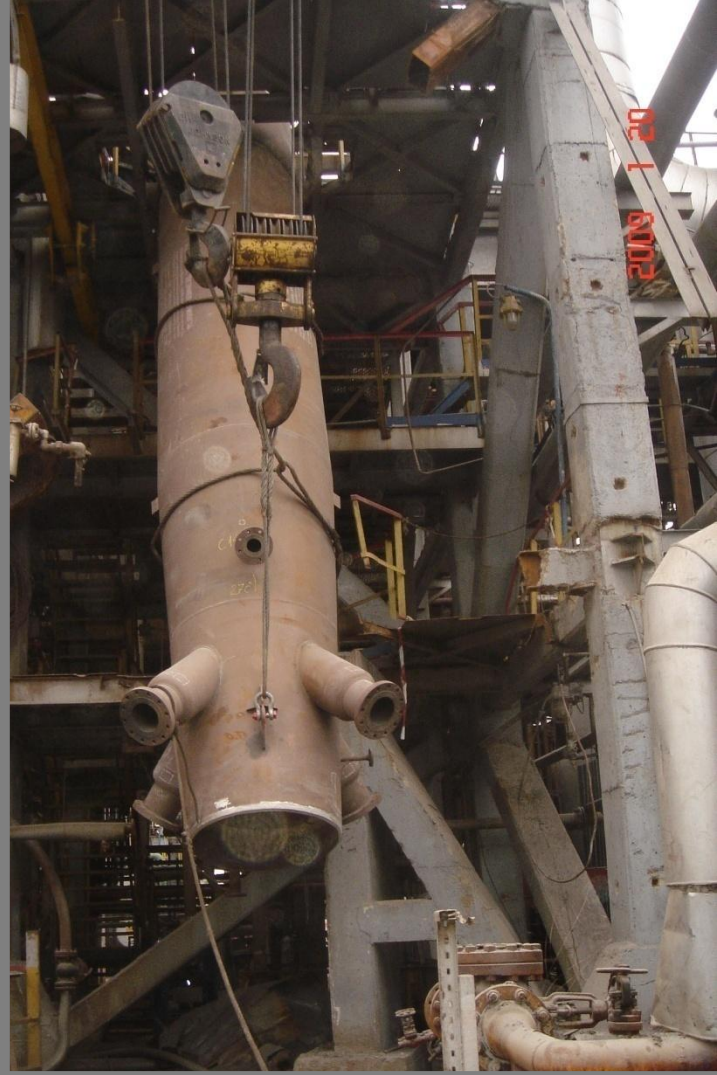
Few Photos :

## Erection of the 2<sup>nd</sup> element of the external riser.

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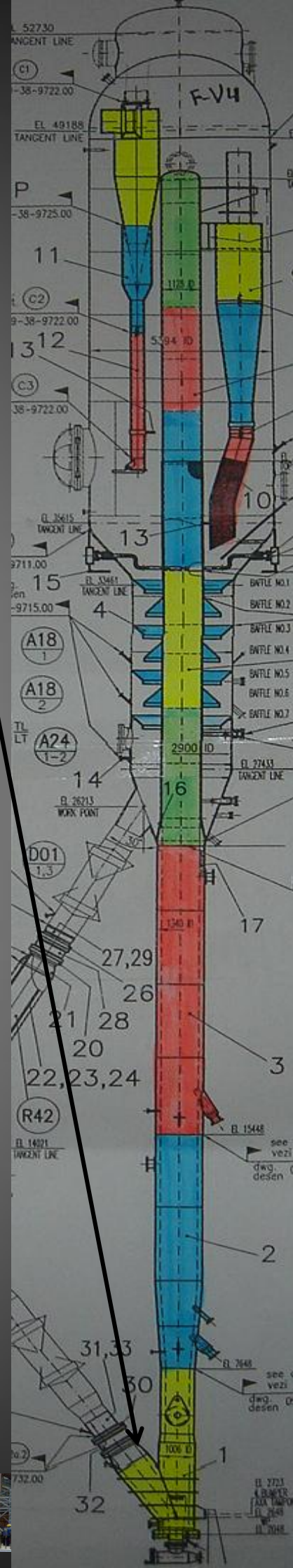








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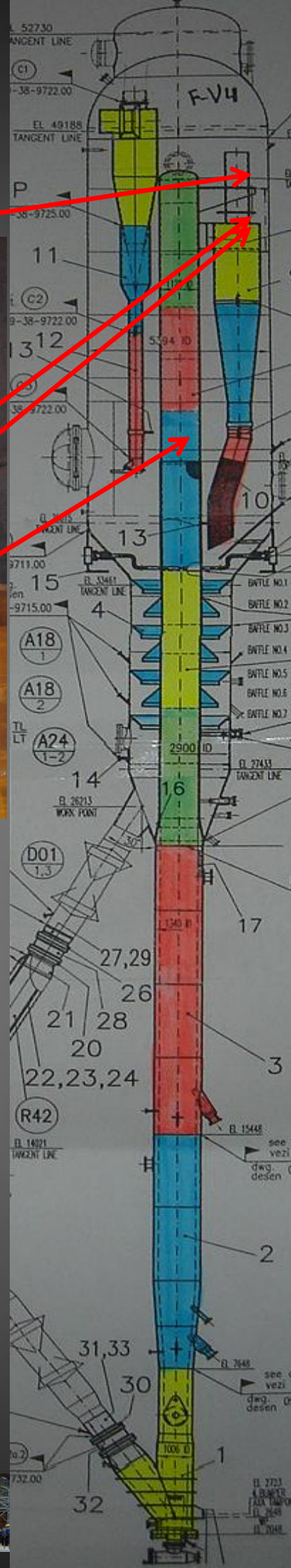
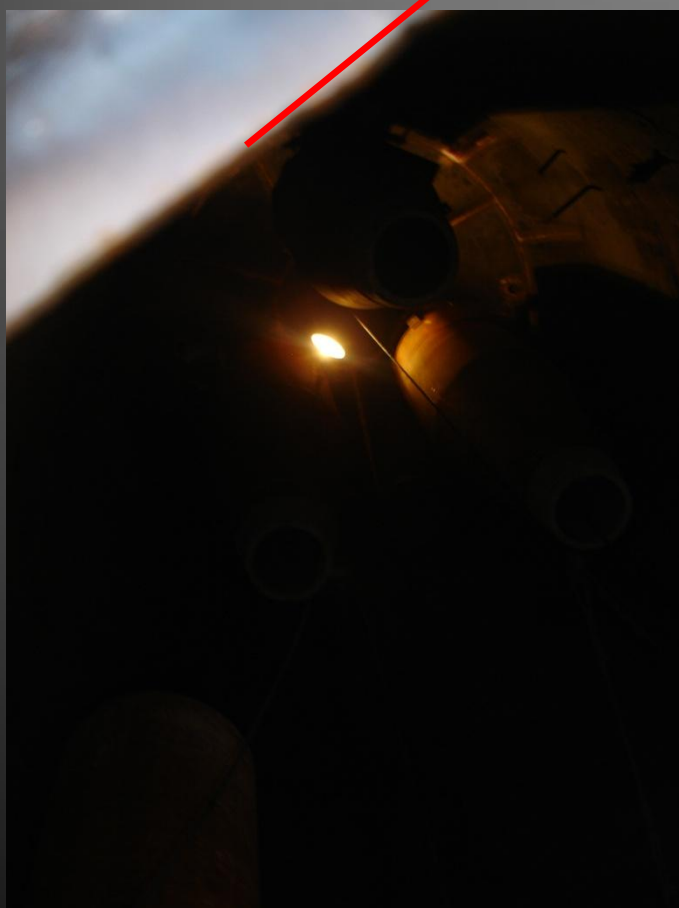




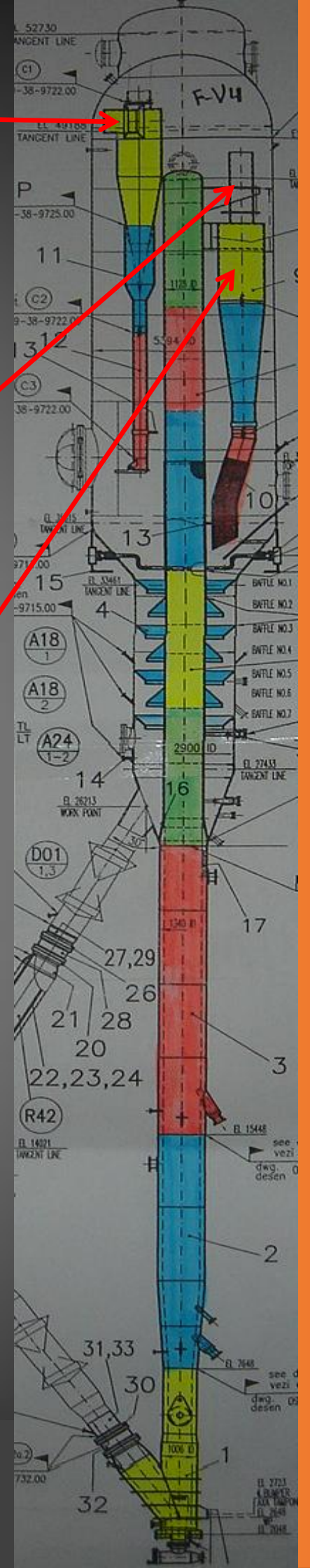
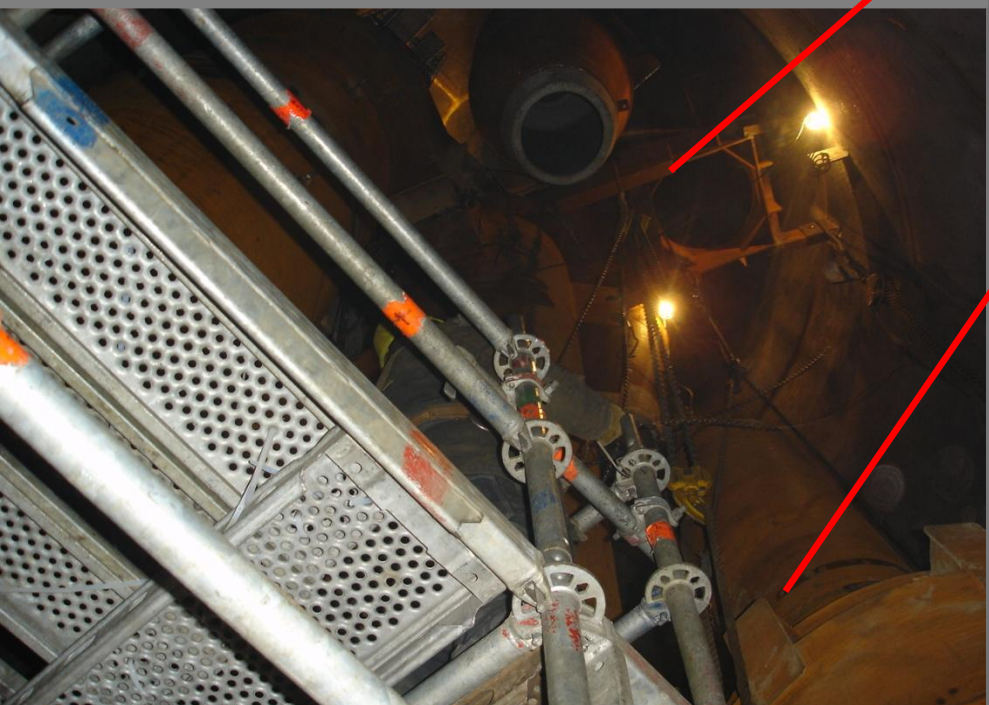




A photograph of a large industrial structure, possibly a ship's hull or a large storage tank, with yellow-painted metal sections and dark, weathered areas. A bright light source is visible on the left, illuminating the scene. Red diagonal lines are drawn across the image, likely for annotation purposes.











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# Isometric Piping



*Piping & Support for Optimix*



*Piping for Optimix*



*Piping for Optimix*



*Piping for Optimix*



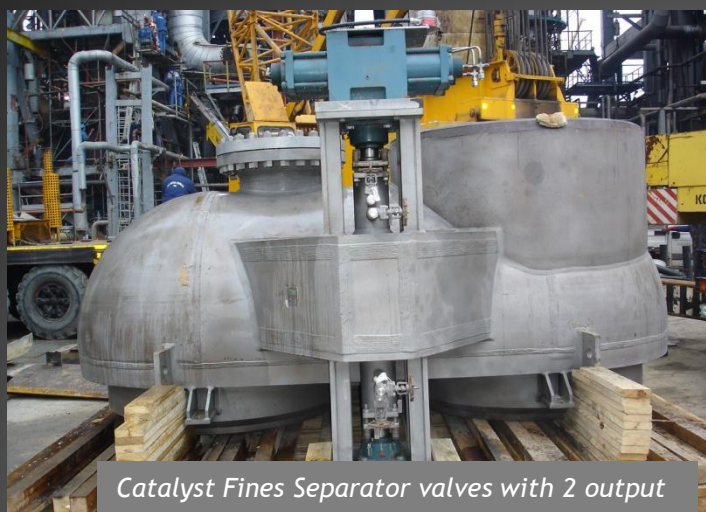
*Piping Raw Material*







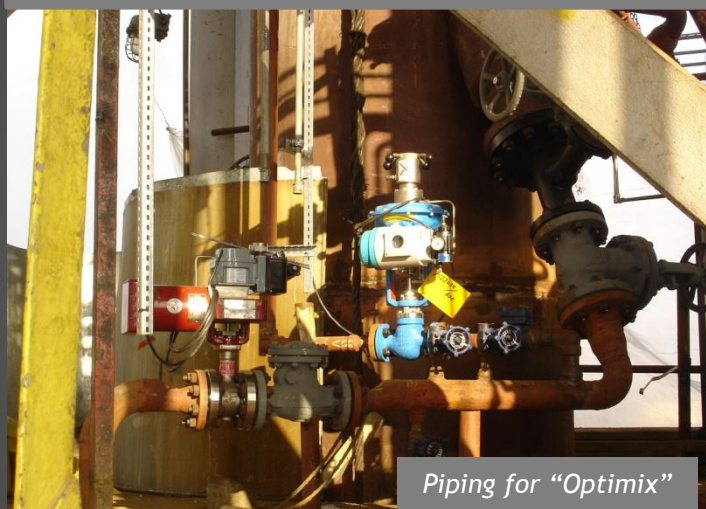
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*Catalyst Fines Separator valves with 2 output*



*Valve for catalyst Regenerator*



*Piping for "Optimix"*



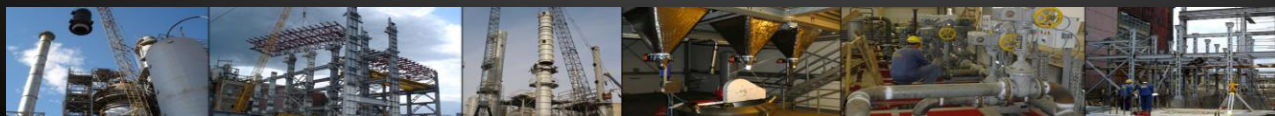
*Piping Prefabrication*



*Stainless Piping prefabrication*



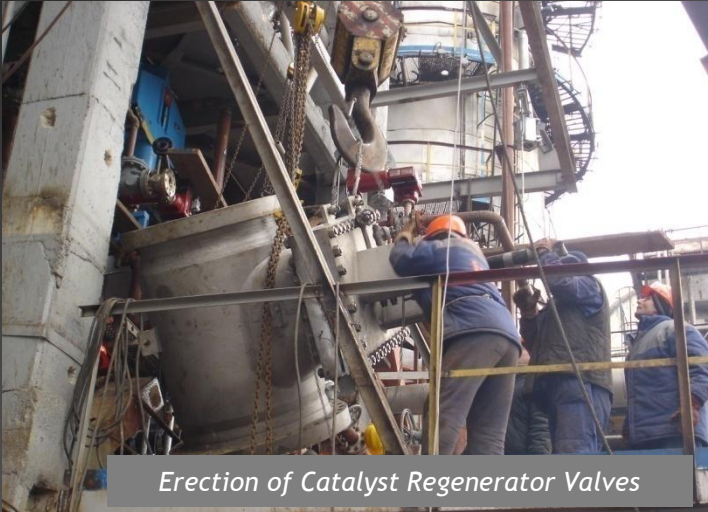
*Catalyst Fines Separator valves entry*







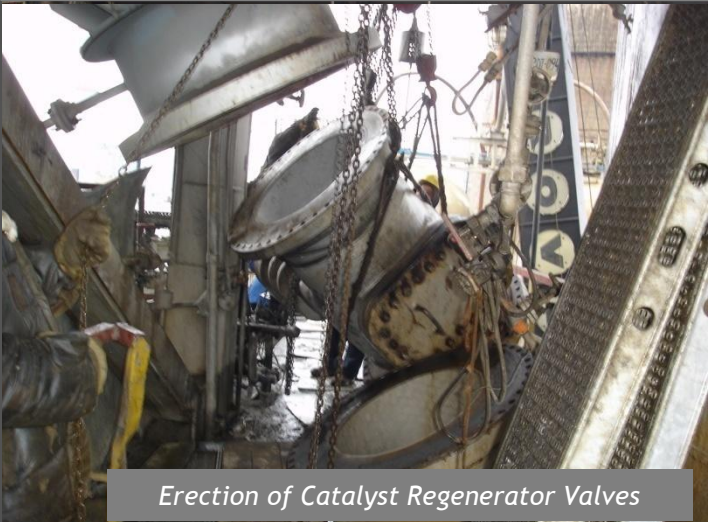
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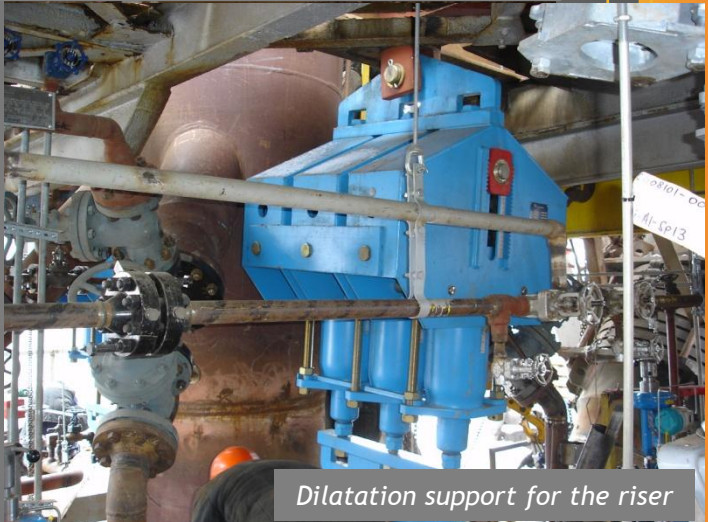
Erection of Catalyst Regenerator Valves



Piping erection



Erection of Catalyst Regenerator Valves



Dilatation support for the riser



Piping erection



Piping erection for CO Boiler







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# Industrial Montaj People and Competences oriented to successful achievement

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