



A New Era Of Alloy Towers In The Sulfuric Acid Industry

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MECS® ZeCor® Alloy Towers - The Preferred Solution

- ~ 400 MECS Alloy towers in operation
 - Experience from middle 90's
 - Sulphur burning, Metallurgical and SAR plants
 - All sizes

Company	Location	Description	Start-up
OCP	Morocco	New ODI plants	2016 to 2019
OCP	Morocco	Absorbing Tower & Drying Tower revamp MPII	2012
Precheza	Czech Republic	Drying Tower & Final Absorbing Tower	October 2013
JPMC	Jordan	2 Drying Tower, 2 Interpass Tower & 2 Final Absorbing Tower	July 2012 & September 2012
Fluorsid	Sardinia	Drying Tower, HRS Tower & Final Absorbing Tower	2013
GCT	Tunisia	Final Absorbing Tower	2011
GCT	Tunisia	Final Absorbing Tower	2012
GCT	Tunisia	New plant	2012
Amplats	South Africa	Interpass Tower	2012
Adisseo	France	Single Absorbing Tower	2013
Lucite	United Kingdom	Drying tower	2014
Tessenderloo	Belgium	HRS Tower	2014
Rosneft	Russia	Drying, Interpass and Final Absorbing Tower	2014
Eurochem Phosphorit	Russia	HRS Tower	2012
Eurochem Belorochensk	Russia	HRS Tower	2009
Glencore	Norway	Drying Tower	2017
Huntsman	Finland	Final Absorbing Tower	2017
Venator	Finland	Inter Pass Absorbing Tower	2018
Boliden	Finland	Inter Pass Absorbing Tower modification	2016
KGHM	Poland	Drying Tower, Absorbing Tower and two pump tanks	2019
Raffineria de Milazzo	Italy	Absorbing Tower	2019
Farabi	Saudi Arabia	Drying, Inter pass and Final Absorbing Tower	2019
Ma'aden	Saudi Arabia	3 Drying, 3 Inter pass and 3 Final Absorbing Towers	2020-2021
Eco Services	USA	Drying Tower	2022
Boliden	Finland	Inter Pass Absorbing Tower	2023
OCP	Morocco	Drying, Inter pass and Final Absorbing Tower	2023
FQML	Zambia	Drying Tower	2024
Police	Poland	Inter Pass Absorbing Tower and pump tank	Under construction
Tarnow	Poland	Final Absorbing Tower	Under construction
Ma'aden	Saudi Arabia	Drying, Inter pass and Final Absorbing Towers	Under construction

MECS® ZeCor® Alloy Towers - The Preferred Solution

- In the last few decades, alloy towers have become the norm due to the following :
 - LESS on-site construction time
 - QUICK installation in existing plants on the same foundation
 - LOWER foundation costs for new plants
 - Quality Assurance: All welded and inspected by one single source.
 - MAINTENANCE: UT while operating & repairable
 - PREMIUM Materials with application knowledge.
 - Require OPERATIONAL excellence: Towers should not be operated out of the desired acid strength and temperature. Instrumentation helps.



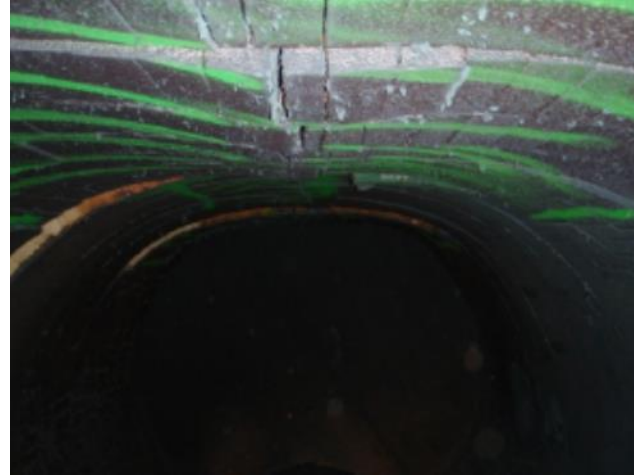
Common Challenges in Brick Towers

The expected tower life is 25-30 years. But problems may have started already before...



Equipment to be replaced

- Nothing lasts for ever
- Reliable operation
- Design change
 - Emission reduction
 - Capacity increased
 - Improved technology
- Equipment
 - **Acid Towers**
 - Gas/Gas Heat Exchangers
 - Converters
 - Steaming equipment
 - Sulphur furnace



Early Considerations

- Schedule
 - It always takes longer than you think
 - When must it be installed?
 - Allowable shutdown time
 - For larger projects, start with engineering study.
- Other
 - Available space - laser scan of work area
 - Available crane size
 - Ground condition in proposed lifting area
 - Budget
 - Performance requirements
 - Interfaces





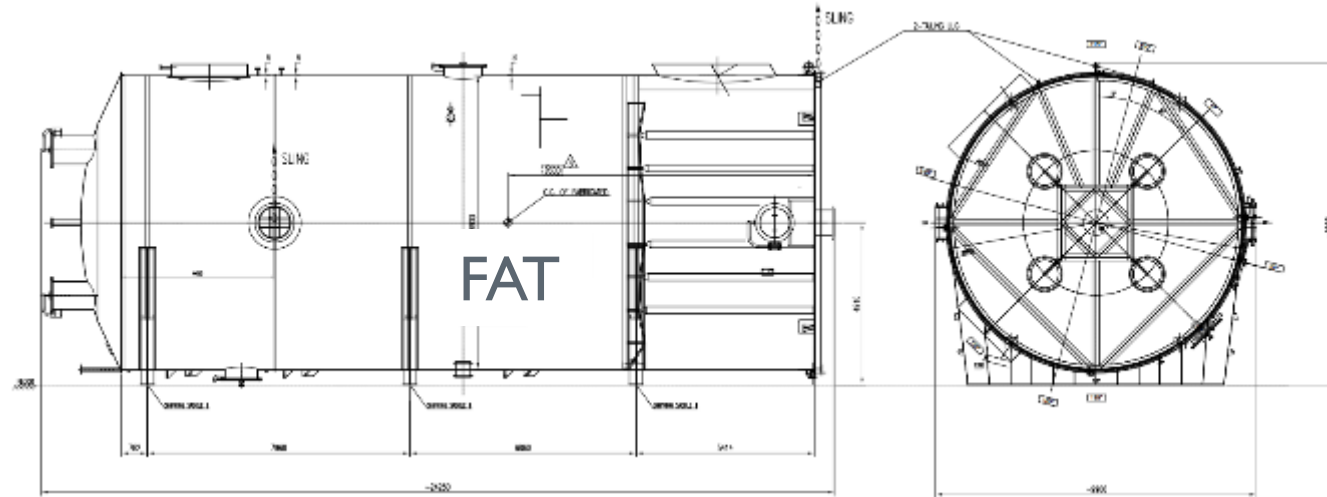
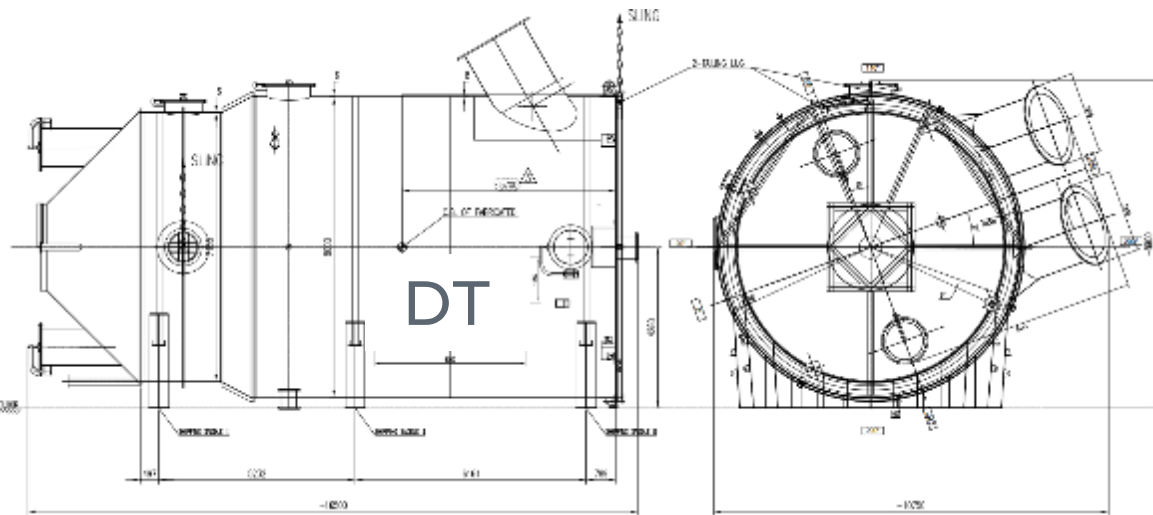
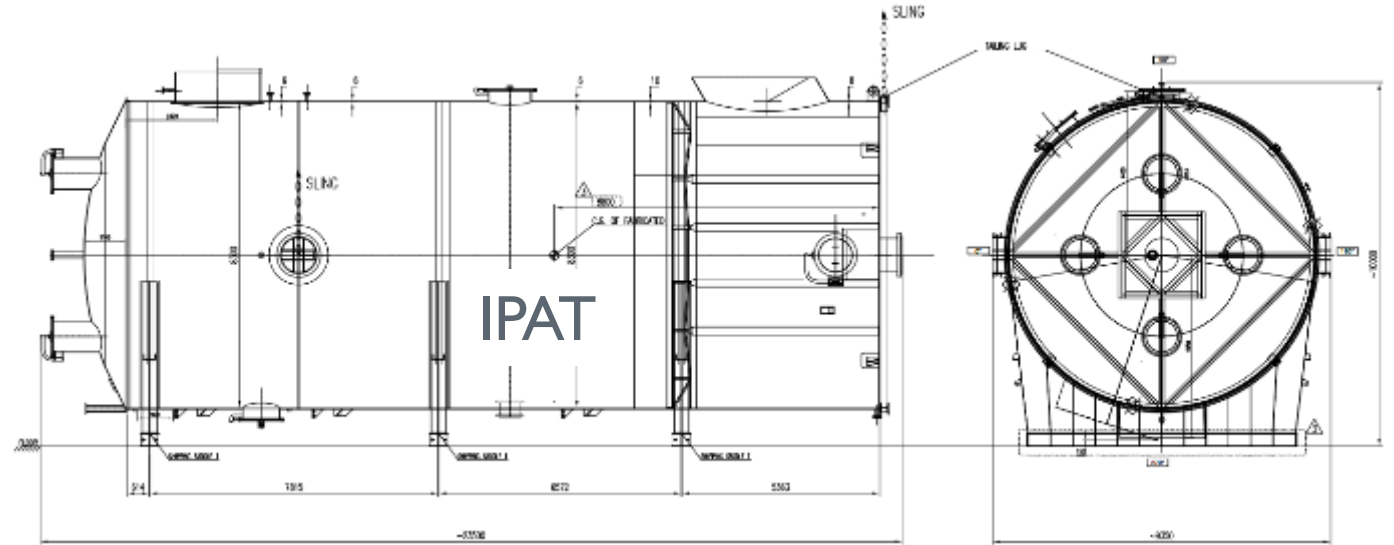
Case Study – Replacement of Towers

- The main objective for the customer to resolve the existing challenges of existing towers that leaks leads to:
 - Frequent Unplanned Shutdown
 - Safety Issues
 - Mechanical Integrity
 - LONG Repair Times During Maintenance



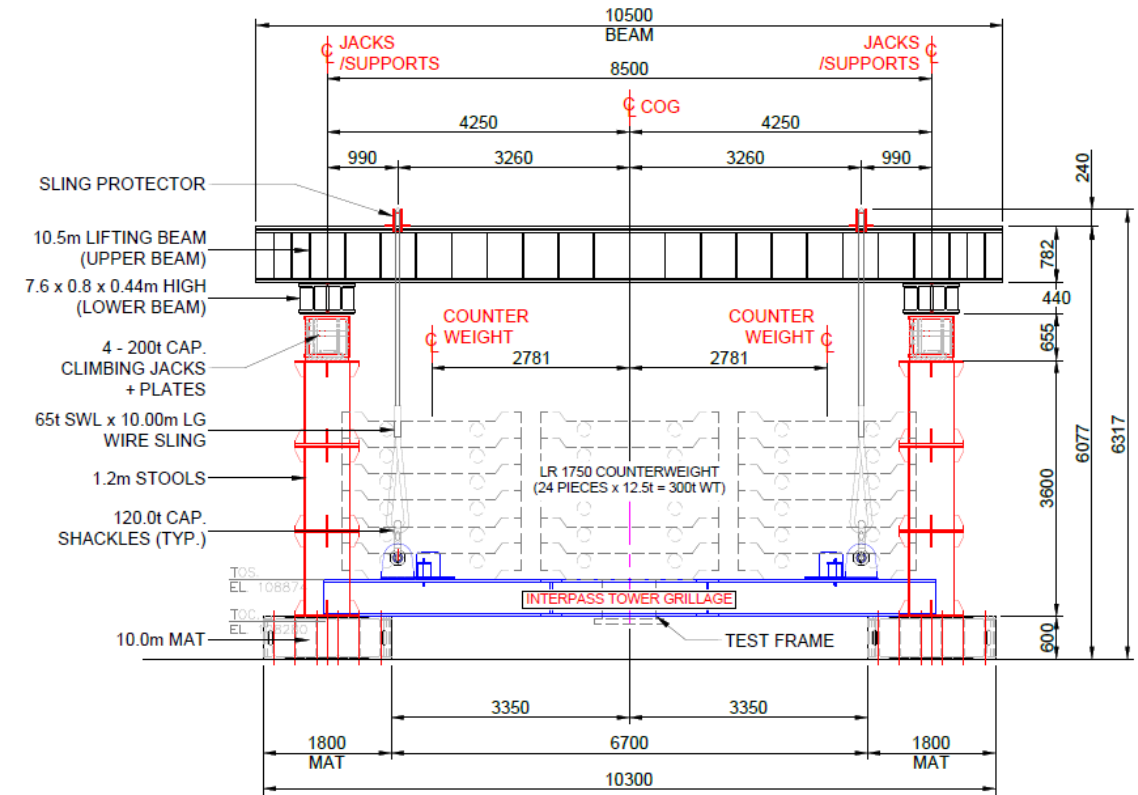
Project Description

- (3) x 5050 MTPD plant
- (3) x DT Ø 8.0m x 16.5m
- (3) x IPAT Ø 8.3m x 23.5m
- (3) x FAT Ø 8.9m x 24.3m



Project Description

- New Towers Delivered fully fabricated
- New support grillages to fit on existing civil
- Grillages load tested for lifting towers fully dressed
- Tower internals fully installed prior to shut
- Make up pipe and duct spools fabricated in advance
- Removed old towers in one piece with internals



Cranes

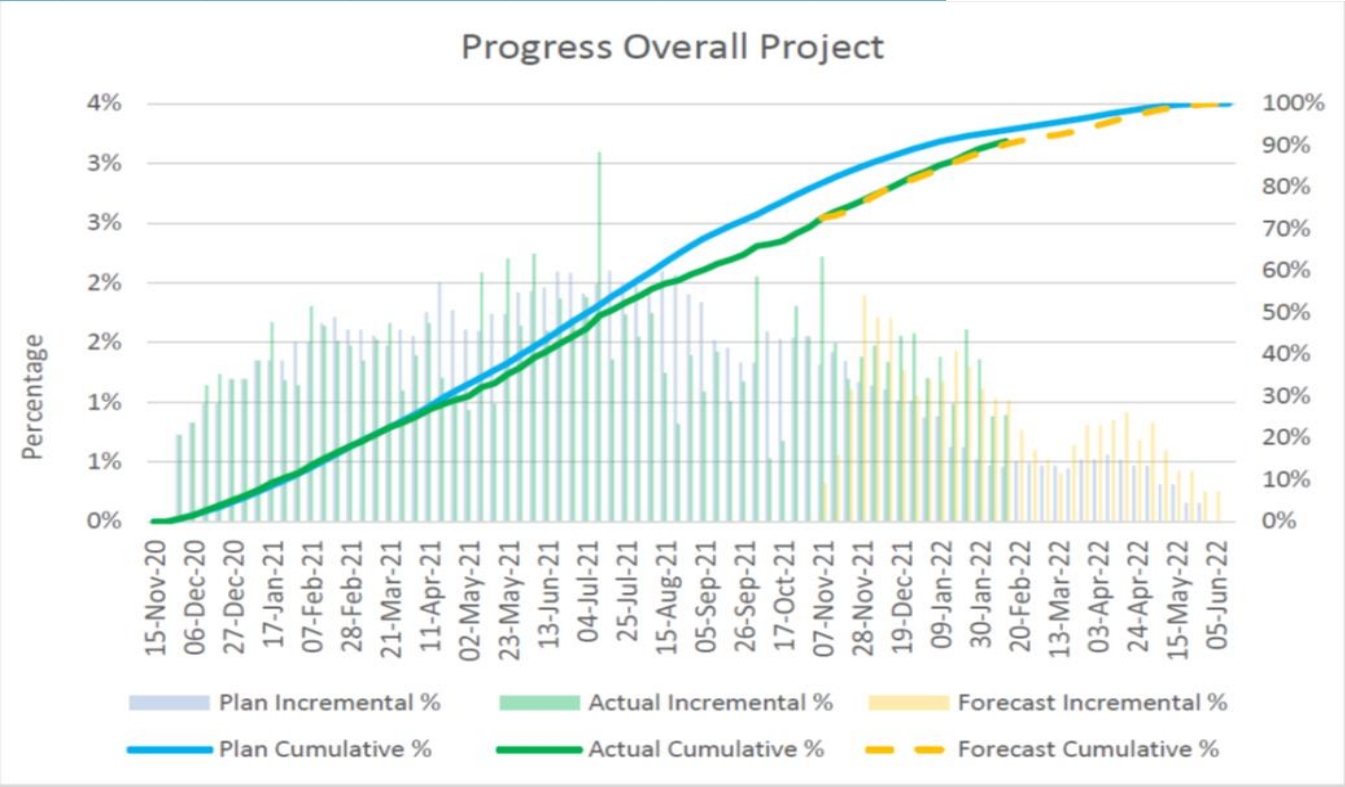
- 2 x Crawler cranes with capacity 1250t and 1600t
- One ring crane with 3200t capacity
- 3D Models and FE was performed
- Unknown integrity of old vessels
- Lifting from base



Project Timeline

	1st set		2nd set		3rd set	
	date	duration	date	duration	date	duration
Engineering contract award	30-Jul-20					91
Fabrication Contract	29-Oct-20					
Fabrication start	13-Nov-20	341	16-Nov-20	436	18-May-21	329
FOB loading	20-Oct-21	42	26-Jan-22	20	12-Apr-22	23
Arrival destination Port	01-Dec-21		15-Feb-22		05-May-22	
Arrival site - Road (1400 km)	25-Dec-21	24	12-Mar-22	25	22-Jun-22	48

- Design & engineering duration 14.7 weeks
- Fabrication duration 389 days
- Plant shutdown < 30 days
- MECS on-site support more than 300 days
- Utilized global supply chain and fabrication network



Logistics

Route surveys and permits

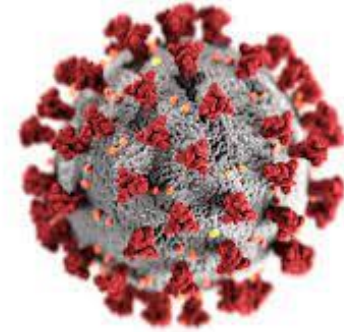


Logistics



The Most Difficult Part of the Project.....

- Pandemic of COVID 19
- Lockdown Due To Covid-19 Started

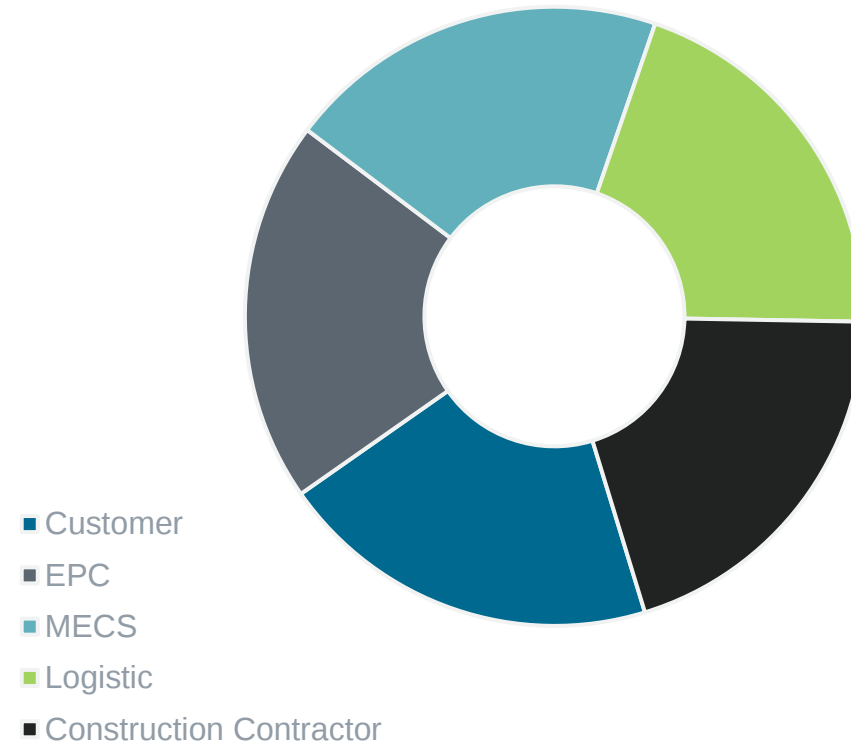


The Main Factors to Achieve Success in this Project

- Experience
- Commitment
- Teamwork



Team Partners



Alternative Execution Options

- Deliver tower in 3 or 4 sections



Alternative Execution Options

- Site assembly from shop pre-fab sections

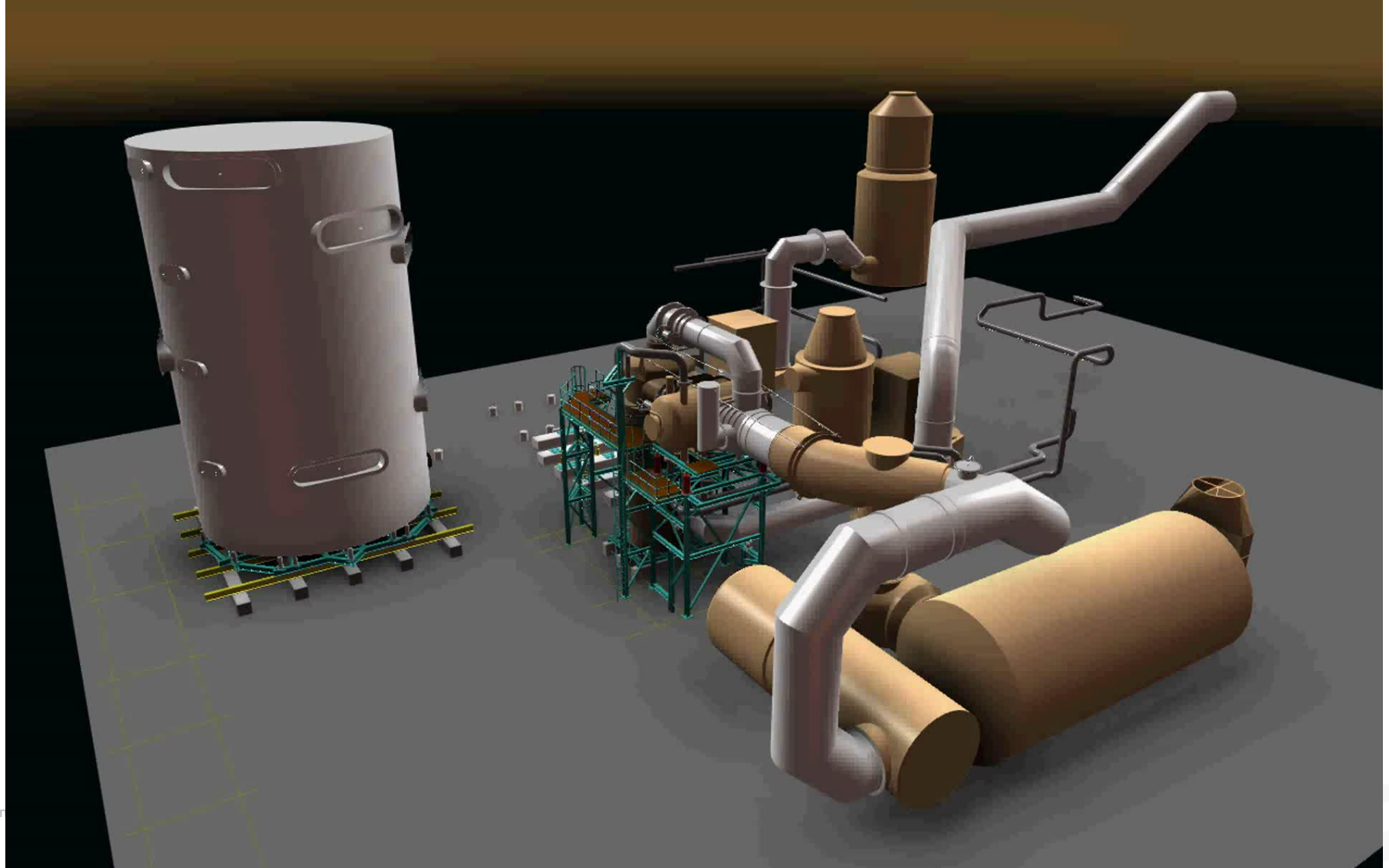


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Alternative Execution Options

- If it cannot be lifted



New Standard in New Sulphur Burning Sulfuric Acid Plant

ZeCor® Alloy

Most of applications
for Alloy Towers
were HRS,
Replacement or in
SAR

Nowadays, many
clients choose Alloy
Towers for new
plants





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