BREAKBULK EUROPE

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ENGINEERING INNOVATION SHOWCASE

Case Study: From Brasil to Mexico: Moving large automotive plant components

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ENGINEERING INNOVATION SHOWCASE

Case Study – Large Automotive Line Components Move

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SCOPE OF THE PROJECT

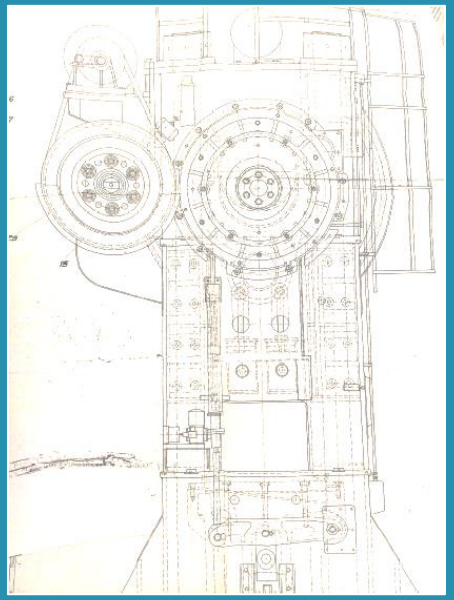
- Move 4 x presses + 1 x kiln from Brazil to Mexico, including:
  - Disassemble
  - Cleaning
  - Rigging
  - Tagging + Packaging
  - Door-to-Door Logistics
  - Installing

EQUIPMENTS (initial dimensions + weight)

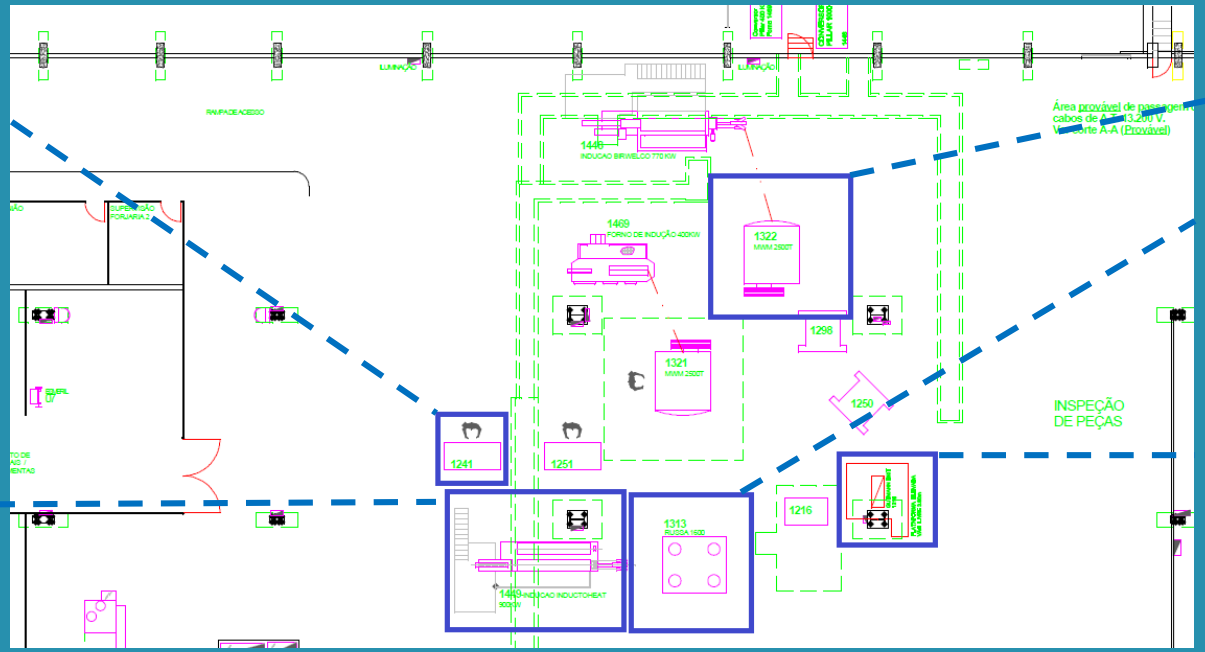
- Press 2500 ton
  8,25 x 5,35 x 4,70 m – 125 ton
- Press 1600 ton
  7,50 x 5,00 x 4,70 m – 125 ton
- Press 400 ton
  5,30 x 3,45 x 2,20 m – 45 ton
- Press 400ton
  4,30 x 2,70 x 2,05 m – 35 ton
- Kiln + Accessories:
  400 ton + 520 frtons

CHALLENGES

- “80’s presses”; no e-drawings available (missing weight and gravity center information)
- Industrial plant located in a residential area
- Not disrupt the on-going 3-shift production line on site
- How disassemble to make sure pieces could be moved out of the plant
- Respect project schedule



PLANT LAYOUT OVERVIEW



ROUTE INSIDE THE PLANT

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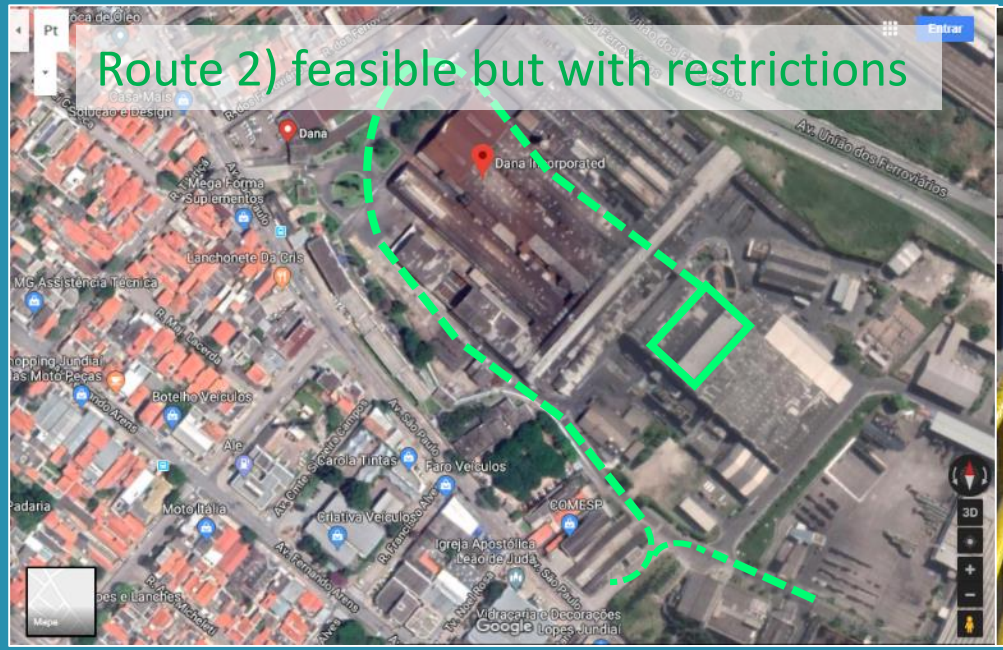
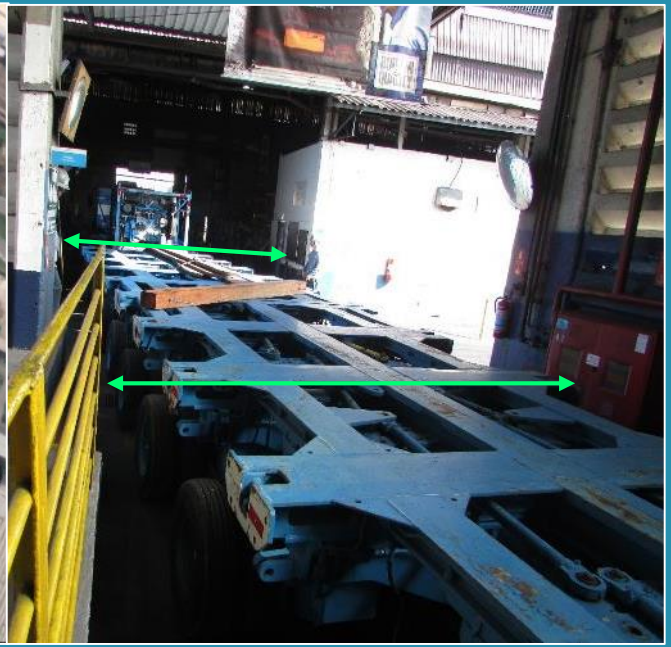




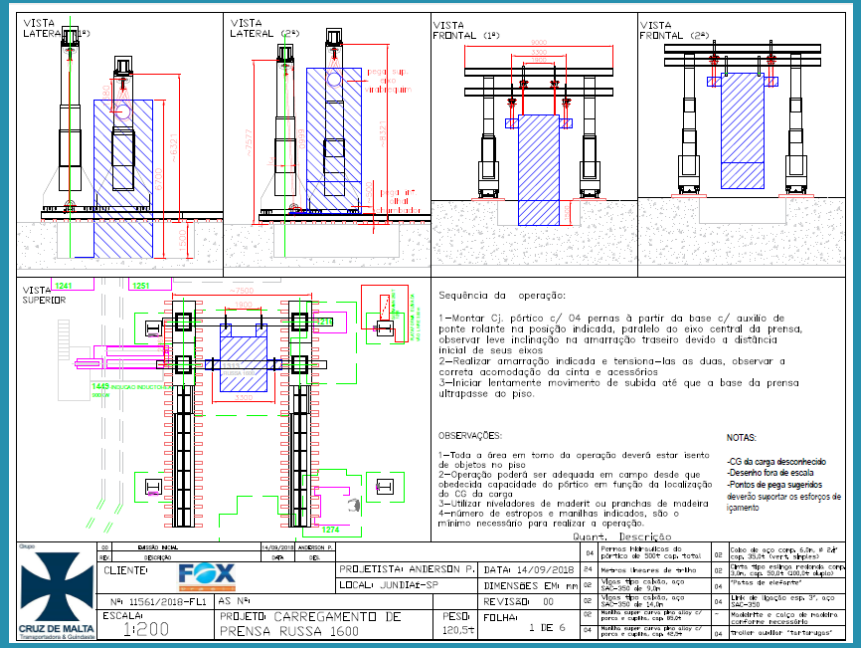
THE SOLUTION

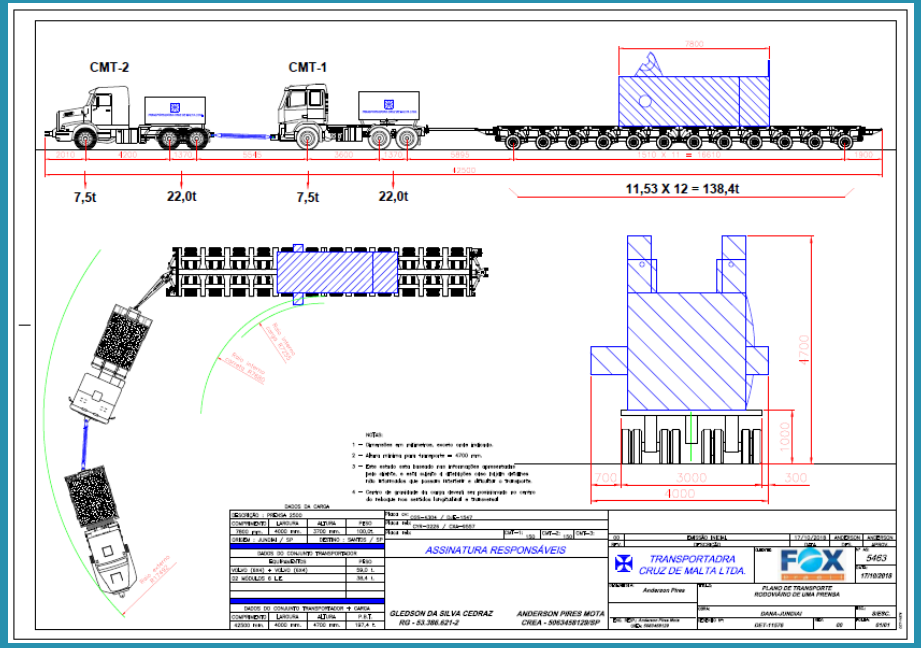
- Teams working simultaneously on different processes: how to optimize resources, tools and equipment for high productivity
- Guarantee a suitable outflow of disassembled items to cleaning and storage area to not affect production flow
- Engineering innovation : 360 camera on live streaming to communicate between our technicians and Mexico team
- Rigging plans






RIGGING PLANS





EQUIPMENTS (final dimensions +weight)

- Press 2500 ton
7,80 x 3,70 x 3,65 – 121 ton
- Press 1600 ton
6,60 x 3,55 x 3,50 m – 96 ton
- Press 400 ton
5,30 x 3,45 x 2,20 m – 45 ton
- Press 400ton
4,30 x 2,70 x 2,05 m – 35 ton
- Kiln + Accessories:
400 ton + 520 frtons

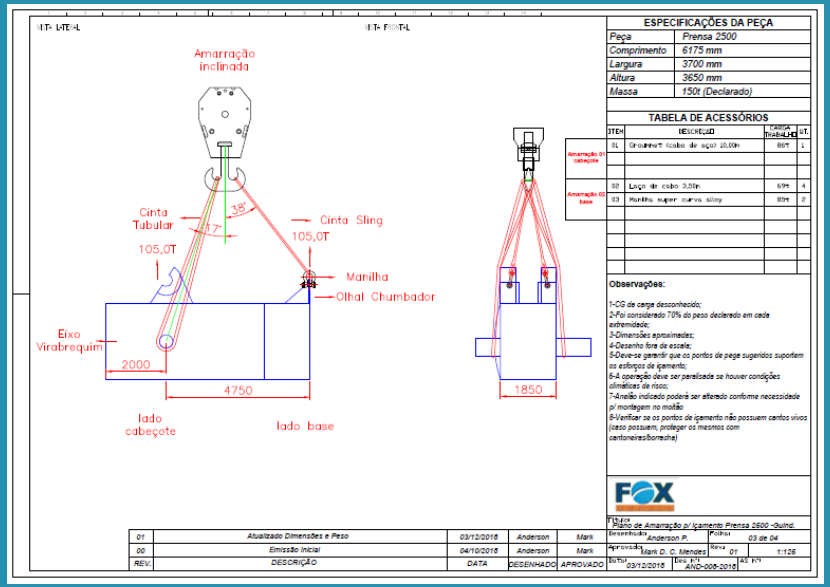
TRANSPORTATION

- Transportation to port of loading: permits restrictions, holidays and bad weather conditions (fog)
- Meetings with trucking company, terminal, stevadores, floating crane, Shipping line and port authorities

LIFTING PLAN

• The old hydraulic presses did not have a detailed technical specification defining the weight and the center of gravity position, therefore these technical aspects were estimated considering the hydraulic pressure in the line and the area of the cylinders of the gantry used for disassembling and tipping the parts. Pressure is the amount of force acting in a certain area. The weight applied in each gantry was calculated by reading the line manometers and calculating the area of the cylinders, making possible to estimate the total mass of the part and the center of gravity position. Moreover, roughly 70% of the weight of the parts would be concentrated in the crane head.

• The supplier from the city of Santos (Armada) provided the moorings necessary during the lifting procedure. Grommets and thimbleless steel cables were used and there wasn't any lifting ring compatible with the dimensions of the crane hook, therefore the cable folding was taken into consideration, which caused a capacity loss proportional to the ratio between the cable folding diameter and the cable diameter, hence a thicker steel cable was used. The capacity loss was related to the curvature of the crane hook, curvature of the lifting shackle connected to the part base and curvature of the crane head shaft.



LOADING ON FLOATING CRANE

SHIPPING ON CONTAINER VESSEL

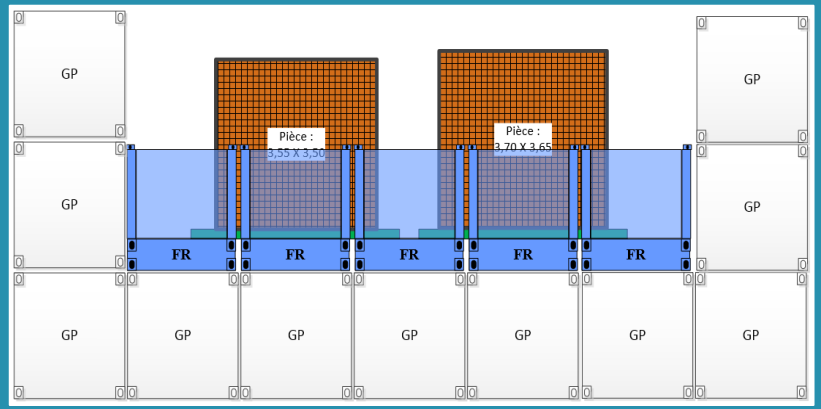
- Loading operation at Port of Santos carried out with w/ 280mt SWL capacity Floating Crane
- Cargo handling in container terminals is not limited to gantry cranes but options may be hiring mobile cranes, truck cranes, floating cranes.

SHIPPING ON CONTAINER VESSEL

- Container ships are not only about “caring” boxes

SHIPPING ON CONTAINER VESSEL

- Securing & Lashing on a bed of 5 x 40’ Flat Racks



UNLOAD OPERATIONS

- Operating Mobile Gottwald Cranes in tandem in Veracruz (Mexico) – 125 + 150mt SWL capacity

COMPETITIVE ADVANTAGES “CONTAINERIZING” PROJECT CARGOES

Global port coverage + Reliable Shipping Schedule + High frequency:

- Multiple port pair offers including via transshipment(s)
- Allows for a reliable and long-term shipping planning
- Forecasting specific departure and arrival dates
- Planning ahead with confidence
- Smooth supply chain
- In case of missing week 1 departure, availability of week 2 sailing
- No detention, no dead freight applied
- Facilitates exact pre-planning for project cargo transports
- Positive impact on the overall project financials by meeting delivery schedule (limited risk for fines)

All-in-one-shipping + Project Tenders (dry, OOGs, breakbulk) :

- Project shipments often consist of numerous components from various origins. Oversized and heavy components need to be shipped as well as smaller freight pieces, stowed in a container

THE PROJECT IN NUMBERS

6

6 months
of work

+100

Over 100
professionals
involved, including
FOX Brasil project and
engineering team

96 121

Heaviest pieces
96 ton and 121 ton

3 x gantry cranes with cap. up to 500 ton;
1 x mobile crane with cap. Up to 75 ton;
1 x floating crane barge with cap. Up to 280 ton;
24-axle line modular trailer

THANKS FOR YOUR ATTENTION

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