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Introduction

- Industrial construction trend is to fabricate larger portions of equipment at specialized off-site locations
- Mobile cranes contribute to the efficiency of construction and material handling on project sites
- Innovation and change in heavy duty Mobile cranes with extreme capacities
Evolution of nuclear facility construction

- Increased nuclear plant component weights required larger cranes
- Nuclear plant designers rarely included crane industry professionals in the facility design phase
- Containment building construction could not be optimized - penetrations, or service hatches, in the wall were required making construction more complex
- Lampson envisioned an “over-the-top” installation methodology using a specialized crane

Transi-Lift Concept

- Lampson envisioned a crane capable of lifting extreme loads to high elevations and then setting those loads at extreme radii in a safe and controlled manner
- Counterweight moved rearward from the center of rotation and set at precisely engineered offsets:
  - With the limiting factor often based on tipping moving the counterweight offset this tendency

Initial Transi-Lift Crane Concept
**Transi-Lift – Design Issues**

- Stable yet mobile foundation – using individually powered tracked crawlers
- Hoisting and luffing power needed – for up to 50 parts of 1 ½” wire rope in 9,000 foot lengths.
- Material for structural components needed to be strong yet light
- Stress on rolling and turning stock
- Boom and mast designed to be easily transportable on conventional roadways

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**Cranes - resultant ground effects**

- Heavy lift cranes induce loads into the ground beneath the cranes footprint
- Specific issues:
  - The weight of the heavy lift crane and its counterweight
  - The weight of the object to be lifted
  - Radii or distance from the center-of-rotation to the center-of-gravity of the suspended load
  - The bearing area which is supporting the lifted load
  - The geometry of the model of heavy lift crane being used
Heavy lift crane geometry

• Previous to Transi-Lift the standard method of increasing capacity was to use a ringer type attachment. Wheeled Mobile Cwt. Wagons were starting to appear.
• Transi-Lift system allows the crane user to:
  1. Alter some aspects of the geometry
  2. Change the CWT. Load based on lift requirements
  3. Adjust footprint and Capacity based on setback of mobile CWT.
Transi-Lift - Mobility

- A major benefit of all crawler cranes is their mobility
- In some instances Mobility is construed as the ability to move an unloaded crane around a project site with little or no disassembly to access differing lift sites
- True mobility is more accurately described as being able to travel safely with suspended loads that are within the cranes charted capacity
Transi-Lift - Adaptability

- Transi-Lift is designed to be easily adaptable to differing work requirements, project sites, and lifting scenarios
- Components can be interchanged between cranes to alter its:
  - overall footprint
  - ground bearing surface
  - boom / mast length
  - jib length

Transi-lift in Nuclear Construction

- Transi-lift was designed, assembled and tested specifically for nuclear projects at Hanford, WA
- The high hook height and exceptional capacity at radius was well suited for “over-the-top” construction methods
- “Over-the-top” changed installation and construction methods for several future plants
Transi-lift in other Industries

- Transi-lift used in other heavy industries with similar lift requirements to that of the nuclear power plant environment:
  - oil refining
  - offshore oil and gas
  - transportation/bridge
  - general construction

Sanmen, China Nuclear Project Lift
Conclusion

- The Transi-Lift system combines the advantages of mobility, high achievable hook height, useable capacity and adaptability, and has proven itself in many industries.
- Continual innovation is evident as newer cranes are equipped with features such as:
  - lower emission electronic diesel engines
  - more ergonomic control stations
  - hydraulic hoists for simpler and safer operations