



**MACHINERY BREAKDOWN LOSS
FOR
COOLING TOWERS**

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CASE STUDY – COOLING TOWER

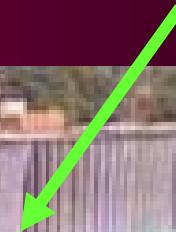
- Cooling Tower Collapse Losses

- ✓ In India there have been a series of losses of wooden cooling towers, nearly 15 nos.
- ✓ Collapse losses across various refineries / fertilizer plants.
- ✓ The losses were intense due to significant Material damage and Business Interruption elements.
- ✓ Loss quantum's were approx Rs 5 to 12 m EUR including LOP for each loss.

COOLING TOWER



Distributor





COOLING TOWER

- **Accident details:**

- ✓ The field operator noticed heavy sound emerging from the Cooling Tower. Immediately he noticed gushing of water from the Riser bottom.
- ✓ Before the operator could intervene the riser and distributor along with complete wooden structure on front side collapsed. It also flooded nearby area due to heavy water coming out of the damaged riser bottom.
- ✓ Immediately after the incident the water return to the cooling tower was cut off **and emergency shutdown was taken for the plant.**

COOLING TOWER



**Collapsed deck
along
with
structure
below it**

**Distributor
lying at
ground**



Damaged splash bars and fill material below the deck





CASE STUDY

- The cooling towers are generally huge devices with sizes as large as 200 m x 15 m x 16 m.
- The structures are either made of concrete or wood.
- In most of the refineries / fertilizer plants in India **wooden cooling towers** are being used due to low capital cost.
- Cooling towers are one of the **most critical utility elements** as the complete process cooling water requirement depends on them.



CASE STUDY

- Collapse of the wooden cooling tower can be attributed to following major factors:
 - A) Failure of wooden support structure
 - B) Failure of vertical riser pipe / joint due to corrosion
- The damage may be due to **one or combination of these factors together.**



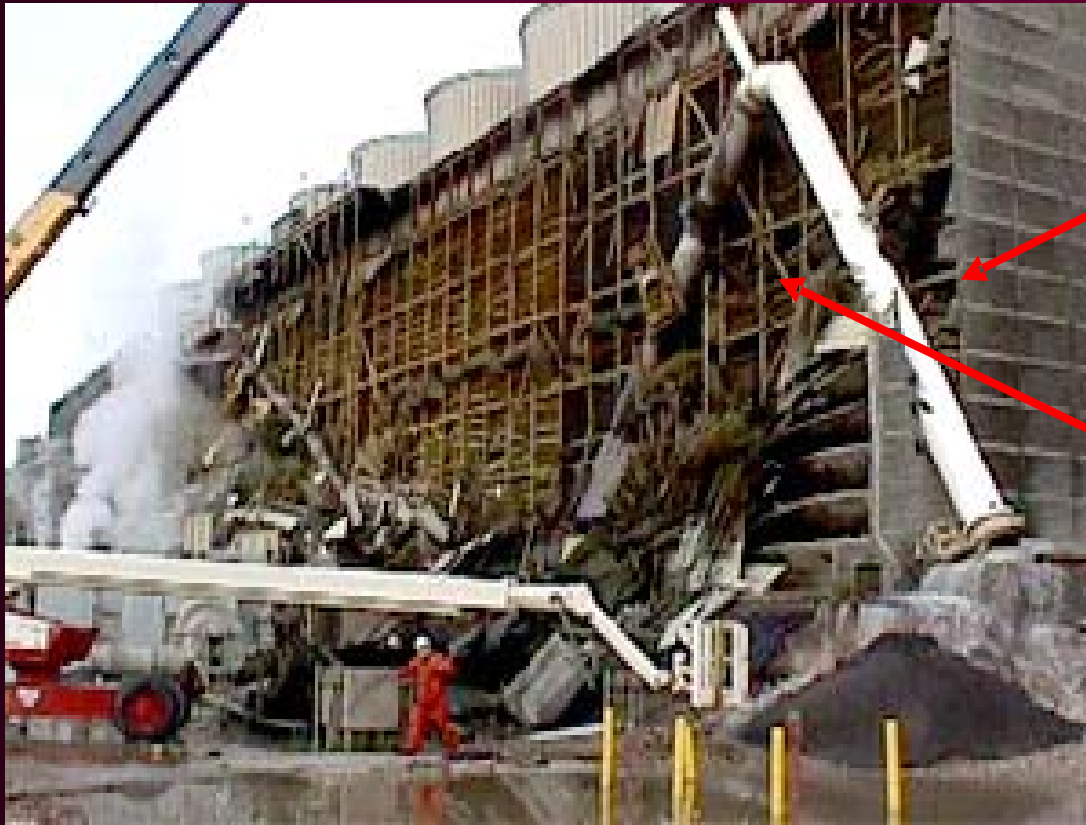
CASE STUDY

A) Failure of wooden support structure:

- ✓ The shear weight of the huge distributor pipe (Approx. 80 meters in length, Diameter ranging from 52” to 24”) running over the deck along with the weight of water in it can lead to collapse in case of failure of the wooden support structure.



CASE STUDY



Riser which was possibly pulled by the collapsing Distributor

Collapsed Distributor

Fig: This picture is showing a damaged air cooler where possibly the collapsing distributor pulled the riser also. (Picture for reference only, not an actual photograph of loss site.)



THANK YOU