Learning from Incidents
Safety Alert from Safety Engineers Association (SEA)

Vol - 7 / No - 79	ALERT - 109	Apr'2022

Title: Toppling of EOT Crane

What Happened

An EOT crane (14.91m span length, 0.65m width, 5.9 T weight, 3 MT capacity) has been erected at 9.05m elevation. It was in a building where sheeting was not done yet. The rail was tack welded up to 7.5 m & the balance rail were loose. Suddenly, a heavy wind 45 knots (23.15 m/s) moved the EOT crane from its position and toppled it - resulting to property damage incident.

What went wrong

⇒ **Unexpected Heavy wind @ 45 knots (23.15 m/s)** moved the crane & toppled it.

⇒ **Adverse to Manual Instruction**: EOT crane was **erected outdoor**; **manual mentions EOT crane shall be erected indoor.**

⇒ **Brakes were released**: For alignment sake the EOT crane breaks were released. So **less force** is enough to move the crane

⇒ **Short travel length**: Only 7.5m length of rail out of 136.5m was aligned & welded. Balance rails were not aligned. So within a short distance the crane travelled and got derailed.

⇒ **Calculated Risk Taken**:

a. Project Hired a crane for a day to erect few equipment which include this EOT crane. If the erection of EOT crane is postponed, then one has to hire a crane again which is not cost effective & additional efforts.

b. Then the brake was released for alignment sake because the on-call technician left site & it's difficult to get his appointment/ another technician at our required date.

All the above action **looked prudent** as no one expected there will be a heavy wind and topple a 5.9Mt crane. But **unexpectedly the** EOT crane was in this **condition for more than a month** due to approval / clearance etc.

Lessons Learnt

⇒ **Adhere to Manufacturer's Manual**: Before deploying any equipment one shall read the Instruction manual. Incident investigation revealed that each crane has different wind speed limits.

At a country, a client specified that **above 25knots** wind speed crane operation shall be stopped. But Manufacturer's manuals specify different wind speed for each model crane. Eg. In the manual of 220T Terex crane when the wind speed is **above 17 knots - lifting to be stopped but Boom can be UP**. If wind speed is **above 27 Knots Boom to be down.**

⇒ **Consult Meteorological department** to know the history of wind speed at area's where a project is executed. This helps us to determine the wind speed limit to adopt at that location and **avoid less or extra precautions**

⇒ **Calculated Risk taken**: At times to expedite execution, Calculated Risk is taken (note: **NOT BLIND RISK**) but that job should be completed at the earliest possible - should not be extended too long and extra precautions must be ensured. Though in this case no one anticipated such incident could happen, eventually - **LOSS** of Money, time, damaged equipment, project delayed etc.

⇒ Only satisfying part no human Injury. If someone was at that spot, can anyone anticipate and prevent injury to the person! So this incident is a high potential severity case.

⇒ Contrarily no job can be done without an element of risk and that risk is mitigated with the limited knowledge of a person. That's why OHS dictum states risk shall be brought to **ALARP level** (**As Low as Reasonably Practical**) and in addition emergency response plan is made. Nowhere its mentioned **NIL RISK**.

Lessons Learnt

⇒ **Different wind speed limit for the same equipment at different locations** - Wind speed limit is fixed based on the wind speed reports obtained from meteorological department & it differs location wise.

⇒ Eg. the wind speed limit of a same tower crane at various location differs. At an inland in western India wind speed was fixed 6m/s & for a coastal area in South was 9m/s. because the wind at coastal area is high.

⇒ When asked at a higher critical location more restriction is applied whereas in this case where wind is more a higher wind speed limit is prescribed?

⇒ Reply: In the inland the wind speed is hardly 2 to 3m/s so 6m/s is prescribed & lighter foundation constructed whereas in the coastal area the normal wind speed itself is 6m/s or so - so a strong foundation is constructed for the tower crane

⇒ **Procedural Control**: What procedural control for the wind speed precautionary?

⇒ In the coastal area, the wind is high during the day and low at night time especially 02:00 hrs. to 08:00 hrs. So site is permitted to use the tower crane during this odd hour.