Crane Operations & Weather Factors

Weather conditions can adversely affect crane lifting activities. They need to be thoroughly considered both during the planning and execution of a lift. Special efforts may be required to ensure adequate warning is provided to avoid a sudden storm disrupting a lift in progress.

WIND

A great deal of judgment is required when assessing when it is too windy to continue lifting operations. Most crane manufacturers have some recommendations concerning the maximum permissible wind speed/gust, or how to derate the crane under windy conditions, since their load charts assume no wind at all. If there is no information on the load chart or in the operating manual instructions, the crane manufacturer should be consulted, and the maximum allowable wind speed/gust and derating information posted conspicuously in the cab or right on the load chart.

Note: In the absence of manufacturers' specific written advice, seriously consider postponing the lift if the wind speed/gust is in the range of 15-20 mph (7-9 m/s). Above 20 mph (11 m/s), the lift must be canceled. When the craning operations have been postponed due to high wind/gust conditions loads must be landed and secured, the boom must be stowed and the following must be met prior to resuming operations.

- ✓ Prior to setting up a lift the wind conditions must be confirmed by the Meteorology Services web site or a reliable Weather Bureau forecast.
- ✓ There must be no immediate threat (enough time to secure all loads and stow the crane, 30-45 minutes), of wind speeds reaching the 20+ mph reading.
- ✓ These wind speeds will be recorded at 30 ft. above open ground

Some of the issues to consider when faced with windy weather conditions are:

- ✓ **The geometry and shape of the load..**
  Is there a large area exposed to wind loads? How difficult will the load be to control if a gust of wind catches it?
- ✓ ***How high is the load to be lifted?***
  Wind speed generally increases with height.
- ✓ ***Backward stability..***
  Backward stability can be a problem when the wind is from the front and the boom is high.
- ✓ ***Wind from behind a crane..***
  Wind coming from the rear of the crane can cause the load to be blown away from the crane, increasing the radius and decreasing the crane capacity.
- ✓ ***Wind from the side of a crane..***
  Wind corning from the side can put a load on the side of the boom and blow the load off vertical; which, in turn, can place an additional side load on the boom. In the United States, most booms are designed for a 20 mph (9 m/s) wind velocity on the side of the boom, plus a side load equal to 2% of the rated load.
- ✓ ***Operating a crane between structures..***
  Operating a crane between buildings or process equipment under windy conditions can be hazardous due to the "wind tunnel" effect. As air blows around obstructions, there can be local areas of increased velocity that may exceed the safe lifting limit even though the general wind speed is not a problem. A wind speed indicator fixed to the boom is a good idea under these conditions.

COLD WEATHER

Extremely cold weather can negatively affect crane and lifting operations. When temperatures drop below 10ºF, appropriate consideration should be made with respect to shock loading, crane hydraulics, and possible derating of the crane (consultation with the Plant Engineering Division's Crane/Hoisting & Rigging Inspector and/or Plant Engineering Division's Rigging Supervisors is required).

The following is a listing of cold weather lifting restrictions:

TEMPERATURES	*PRECAUTIONS*
Temp of -15ºC to -30ºC (-5ºF to -22ºF)	Avoid impact or shock loading of crane and rigging. Operations involving hydraulic cranes should be conducted with due regard to potential failure of hydraulic components. For critical lifts, cranes should be derated by 25%. The effect of wind chill on operators, riggers, and signal persons should be considered. Lifting should be halted if these personnel are unable to operate efficiently and safely.
Temp of -30ºC to -40ºC (-22ºF to -40ºF)	Cranes should be derated by 40% for all lifts, and halting of all lifting activities should be considered. The effect of wind chill on operators, riggers, and signal persons should be considered. Lifting should be halted if these personnel are unable to operate efficiently and safely.
Temp Below -40ºC (-40ºF)	All lifting prohibited except for extreme emergencies (critical lift procedures).

OTHER CLIMATIC CONDITIONS

RAIN, FOG & SNOW

Other weather conditions can create hazardous conditions for lifting. ***Rain***, ***fog***, or ***snow*** could obscure the load, the signal person and/or the boom tip, making crane-lifting operations very dangerous. In addition, extreme heat, heavy rain, snowstorms, or even heavy snow flurries can be distracting to those involved in the lifting operation. It is important for those people to remain focused on the lift until the load is safety landed, and the load is off the hook. During bad weather such as rain, snow or fog, stop operation and stow the machine. Wait until visibility improves before resuming operation.

LIGHTNING

Crane booms can act as a ***lightning rod*** and great care should be taken to be aware of changing weather conditions if a thunderstorm should suddenly develop. At the first sign of a thunderstorm (or at least of

lightning), lifting activities should be brought to an orderly close. The boom should be lowered and/or retracted as much as possible, and personnel should leave the area. If the crane is struck by lightning, it should be thoroughly inspected before being put back into service. The path of the electricity is difficult to predict and there may be hidden damage (pitting) where arcs have occurred (often in bearings).

HEAVY RAIN

Heavy rain, especially if wind-driven, also can affect crane operations. Water can get into friction elements (brakes, clutches, etc.) and render them inoperable. When these conditions exist on older friction-type cranes, operators may have to "dry out" the brakes by lightly engaging the device enough to produce enough heat to dry out the components.