

Summary

Each year hundreds of crane accidents happen over the entire world. This results in a lot of damage but also numerous injuries and fatalities. This report provides: statistical information regarding crane accidents worldwide, in the US and in the Netherlands, examples of mobile, tower and maritime crane accidents and three detailed descriptions of severe recent crane accidents. All this information will give insight in the type of accidents and major risks involved in the crane industry.

The perception is that crane accidents tend to happen more often today, this is however not proven. The registration of crane accidents has been improved and new media reports more often spectacular crane accidents. From several reviewed former crane accidents studies it is concluded that the majority of the accidents happen with mobile cranes. The two major causes of mobile crane accidents are: touching overhead power lines, in the US, and instability of the load, in the Netherlands. Tower crane accidents are significant less subject to failures and accidents in relation to mobile cranes. Not following instructions during the erection and dismantling of tower cranes is the major cause of tower crane accidents. Maritime cranes are vulnerable during the operation for example collisions with ships which can cause boom or frame failures. The tie down of maritime cranes is also often subject to failures. During storm or bad weather cranes are tied to the wharf, but if a crane breaks loose it can run into another and the result can be disastrous. Depending on the location of a wharf, maritime cranes can also be vulnerable for seismic influences.

Three interesting recent crane accidents are described in detail to provide more insight into what an accident involves: the Big Blue crane accident, the New York tower crane accident, and the Rotterdam tower crane accident. The massive *Big Blue* mobile crane was in operation at a construction site in the US. During the lift of a roof section, the load got cached by the wind. The king pin of the crane, which allowed the crane to turn, failed and crane collapsed and was destroyed in total. The entire accident has been recorded on video and therefore it is one of the most well known crane accidents in recent history. In New York, US, a tower crane accident happened during climbing operations. The crane tie in assembly got loose from the crane and the crane collapsed over surrounding buildings. Investigation revealed that during the climbing operations improper rigging was performed. A recent tower crane accident in Rotterdam caused the life of the crane operator. During a lift the crane wasn't able to handle the load and the crane collapsed. Investigation by the Dutch Labour Inspectorate concluded that there were faults in the design of the crane made: the deflection of the jib was larger than calculated and the engine of the trolley wasn't able to provide enough power to hold the load.

The registration of crane accidents is not adequate. Not only the serious accidents, but also even situations which could lead to an accident should to be reported. With more detailed information available more extensive research can be performed into the causes of crane accidents. This eventually may lead to a decreasing number of accidents and fatalities in the future.

Furthermore is the training of operating personnel essential to decrease the number of accidents. Therefore also manufacturers need to be more involved, supplying manuals and training for the procedures. Improving maintenance procedures and plans are also of great importance.

It will always remain difficult to reveal the exact cause of an accident, there are many variables. But this report shows that the origin of the accidents is often related to human failure.