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**External Warning signals of the Rated Capacity Limiter,
speed reductions and Event Recorder for mobile cranes**

**Externe Warnsignale der Lastmomentbegrenzung,
Geschwindigkeitsreduktion und Event Recorder für
Mobilkrane**

**Signalisation extérieure du Contrôleur d'État de Charge,
réduction de vitesse et enregistrement de données pour
grues mobiles**

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1 INTRODUCTION

The main goal of this document is to provide design rules for a standard way to warn people in the vicinity of the crane about the actual load status of the machine. In contrary to the warning signals inside the cabin (seen only by the operator who well knows the machine and its specific features), it is crucial to ensure a common warning concept for people surrounding the crane (these persons don't know the crane brand or type and are not even supposed to have any skills about cranes); therefore, a standard warning philosophy was necessary to increase job site safety.

2 SCOPE

This document applies to mobile cranes and is considered as a complementary rule to EN13000:2010, chapters 4.2.6.3.3 and 4.2.6.3.4.

3 REQUIREMENTS FOR RCL COMPLIANT WITH EN13000:2010

FEM Manufacturers have defined detailed functionalities for the Rated Capacity Limiter. These features are complementary to the specifications described in EN13000:2010.

The table below describes these requirements.

NOTE: In setup mode, the speed reduction for ALL movements has been defined in order to avoid misuse of this function; setup mode shall only be used for rigging/de-rigging or in case of deadlock. The setup button shall not be used during regular lifting operation or as "capacity booster".

The warning signals and their hierarchy described in the table have been defined under following considerations:

- Movement cut-off such as from a hoist limiter are not signalized with external visual or external audible warning since it is to be considered that such cut off do not lead to a hazardous situation.
- Situations where the crane loading is beyond the permissible limits (overload) and is not limited any longer by safety devices (e.g. RCL overridden) correspond to the highest warning level and the corresponding warning signal shall be dedicated to this warning.

4 EXPLANATION AND POSSIBLE CONTENT OF OPERATOR'S MANUAL

In case of an emergency during setup mode, the operator can deactivate the setup-mode and will then get back to "normal operation"; he'll then have the possibility to get out of the overload situation at normal speed and return to a condition with reduced risk as required by the product standard EN13000.

The deactivation of the setup button when the load is above 100% shall only be used in case of emergency situation; when getting back into the "normal Operation" mode with a load exceeding 100%, the RCL will automatically trigger the event recorder and the audible and visual warnings inside and outside the cabin.

After any overloading, it is highly recommended to proceed with a thorough examination of the load bearing structure of the crane.

Table: RCL requirements

| Mode | Phase | Limits | Movement possible / Speed | | Event record | Warning OUTSIDE cabin | | |
|--|---|---|---------------------------|--|--------------|-----------------------|---------------------|---|
| | | | Load increasing movement | Load neutral or load decreasing movement | | VISUAL | | AUDIBLE |
| | | | | | | 3 colour light | single colour light | |
| OPERATION | normal | load < 90% | YES 100% | YES 100% | NO | Constant green | no light | no sound |
| | approach | 90% <= load <=100% | YES 100% | YES 100% | NO | Constant yellow | no light | no sound |
| | overload | load >100% | NO | YES 100% | YES | Constant red | Flash red | sound intermittent, cancelable after 5s |
| SETUP Setup Button activated | Set-up mode Load Charts available LMI active | load < 90% | YES 15%* | YES 15%* | YES | Constant green | no light | no sound |
| | | 90% <= load <=100% | YES 15%* | YES 15%* | YES | Constant yellow | no light | no sound |
| | | 100% < load <=110% | YES 15%* | YES 15%* | YES | Flash yellow | no light | no sound |
| | | load >110% | NO | YES 15%* | YES | Constant red | Flash red | sound intermittent, cancelable after 5s |
| | (De)Rigging procedure no loads allowed No Load Chart available | No max Load indication if possible: specific movement cut offs for monitoring of (de)rigging | YES 100% | YES 100% | YES | Flash yellow | Flash red | no sound |
| EMERGENCY Bridging Device | Bridging Device (outside cabin) in case of: - Failure of components - Emergency Situation | LMI inactive Any load status | YES 15%* | YES 100%** | YES | Flash red | Flash red | sound constant, not cancelable |

* For mobile cranes where the actuating device controls the hydraulic pressure and where the speed reduction is provided by a central control pressure reduction, the speed shall be reduced to max. 25%

** The speed reduction can be applied to all movements for mobile cranes where the actuating device controls the hydraulic pressure. Due to the wide range of crane types in the scope of EN13000, the manufacturer may define a lower permissible speed.

References

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