



Position paper of
FEM Product Group Cranes and Lifting Equipment
Sub-Group Mobile Cranes
External Warning signals

Legal Note: *This publication is only for guidance and gives an overview regarding the assessment of risks related to external warning signals emitted by the mobile crane to people in the vicinity of the machine. It neither claims to cover any aspect of the matter, nor does it reflect all legal aspects in detail. It is not meant to, and cannot, replace own knowledge of the pertaining directives, laws and regulations. Furthermore the specific characteristics of the individual products and the various possible applications have to be taken into account. This is why, apart from the assessments and procedures addressed in this guide, many other scenarios may apply.*

Summary:

FEM Mobile Crane Manufacturers defined an industry guideline FEM 5.014 "External Warning signals of the Rated Capacity Limiter, speed reductions and Event Recorder for mobile cranes", in accordance with and as a complementary rule to EN13000:2010 Cranes – Mobile Cranes. Manufacturers are of the opinion, that any additional external warning signals not representing an immediate danger, should not "dilute" the defined safety concept and should not negatively affect the safety awareness of people in the vicinity of the crane.

Background:

FEM 5.014 Standard:

FEM Product Group Cranes and Lifting Equipment – Mobile Cranes has published the FEM 5.014 Document called “Guideline - **External Warning signals of the Rated Capacity Limiter, speed reductions and Event Recorder for mobile cranes**”; March 2013. This guideline is available for download and is free of charge.

The main goal of this document is to provide useful information about characteristics of warning signals used to warn people in the vicinity of the crane and showing them the actual load status of the machine. Contrary to the warning signals inside the cabin (seen only by the operator who knows the machine and its specific features well), it is crucial to ensure a similar warning concept for people in the vicinity of the crane, regardless of the crane brand or type and people’s skills (these persons might not be familiar with cranes). Therefore, a uniform warning philosophy is necessary to increase job site safety.

Safety concept:

FEM Mobile Crane Manufacturers defined external warning signals according to the following essential safety considerations:

- **Consistency:** External warning signals are efficient only, if they are defined in an uniform and consistent manner for all mobile cranes, regardless of the machine brand and the jobsite where the crane is used.
- **International standards:** External warning signals follow simple, efficient rules defined in international standards (EN13000 which refers to further standards, such as ISO and EN); these standards describe the appropriate signal properties for each situation (colours, sound, etc). External warning signals according to EN13000 and FEM 5.014 are categorized in several stages related to the level of importance: from green without sound, to flashing red with intermittent sound. This hierarchy follows international standards, e.g. ISO 7731 Ergonomics - Danger signals for public and work areas - Auditory danger signals, EN842 Safety of machinery - Visual danger signals - General requirements, design and testing, EN981 Safety of machinery - System of auditory and visual danger and information signals.
- **Safety awareness:** FEM carefully defined the warning signals in such a manner, that the highest warning levels are reserved for the most dangerous situations, e.g. in case of overload, the external visual warning signal is a red flashing light to enhance the awareness of exposed people.

Thus a red light is an unsuitable warning signal for a limit switch, such as hoist limiter/anti-two block system or any other stroke limit switch (cylinder-end switch). These limitations of movement correspond to normal crane operations and do not represent any danger.

FEM Statement:

FEM Mobile Crane Manufacturers are of the opinion that external warning signals **not** representing an immediate danger (e.g. activation of limit switch) should be different from signals given in obviously dangerous situations (e.g. crane overloaded). As an example, adding external warning signals for activated limit switches may compromise the defined safety rules and warning signal "hierarchy". The activation of the limit switch stops the movement automatically and therefore does not represent any hazard for people in the vicinity of the crane. Examples of such limit switches are:

- Hoist limit switch / anti-two block
- Lowering switch (e.g. third remaining rope wrap)
- Cylinder-end switch (e.g. telescoping, luffing)

The red warning light indicates a dangerous situation around the crane. In case of the above-described non-hazardous situations (e.g. activation of a limit switch), using a red warning light would lead to a higher occurrence of these warnings and might therefore confuse people in the surrounding area. As a consequence, these people might not take the "real" safety warning seriously (e.g. crane overloaded). This effect would be against the safety approach defined in the FEM standard.

FEM Manufacturers do not intend to equip mobile cranes with additional external warning devices if their functionalities are in contradiction with the mobile cranes safety standard EN13000 and the industry document FEM 5.014.

Contact:

Klaus Pokorny

VDMA

Lyoner Straße 18

60528 Frankfurt Main, Germany

E-mail: Klaus.Pokorny@vdma.org