

## ENGLISH SUMMARY

### for report no. 2020-5444 - "Lifetime extension for cranes and lifting equipment – framework and criteria's"

Lifting operations are associated with high potential risk. It is therefore important that lifting appliances are inspected and maintained in order to ensure prudent operation. Lifting appliances must be dimensioned and designed to maintain an acceptable probability of satisfactory performance throughout the design lifetime. In cases where the lifetime of the facility (on which the lifting appliances are located) needs to be extended, a lifetime assessment of the lifting appliances must be performed as a basis for deciding whether to use them or replace them in the lifetime extension of the facility.

This report focuses the lifetime assessment of lifting appliances towards aging. In such an assessment, it must be documented that the aging processes that are included in the total aging are managed. Total aging is defined as the sum of three factors: aging of needs, aging of technology and functional aging. There are several aspects to each type of aging that can influence a decision to extend the lifetime of lifting appliances. The report therefore addresses the most central processes in the various types of aging. The main statement in the report is that aging management ensures prudent operation of lifting appliances with regards to maintaining technical and operational integrity, achieving compliance with regulatory requirements and meeting performance requirements for the lifting appliances in the lifetime extension.

In order to deal with the aging of needs resulting from changes in statutory requirements and technical standards, it is important to know the historical development in regulations and standards. The development of regulatory requirements and technical standards for the most commonly used groups of lifting appliances have been mapped. The results of the mapping are summarized in the report.

Functional aging represents the traditional perception of the aging concept. It signifies physical degradation of the equipment. For fatigue, being a process that is hard to monitor solely by inspection, a description of lifetime analysis is included. It is a computational analysis based on the original classification of lifting appliances and mapping of actual use. It is also described what measures can be initiated by a lifetime assessment (e.g. general overhaul and special assessment).

The report establishes a framework and a methodology for lifetime extension of lifting appliances. This is described as a combination of trigger questions and subsequent measures to maintain prudent operation of the lifting appliances. The sum of measures forms a complete basis for concluding which upgrades and / or compensating measures must be implemented in order to use the equipment further in a lifetime extension for a facility. A description of what must be documented is also provided.

This assignment focuses primarily on fixed lifting appliances of groups G3, G4, G5, G7 and G8, but the principles described in this report can also be used for lifetime extension of lifting equipment in groups A, D and H according to NORSOK R-002.