

## SIMULATION OF FATIGUE DAMAGES IN SECONDARY TRUSS OF CRANE

Basing on the damaging statistics obtained during the on-site inspections of industrial multi-span building structures with under-crane secondary trusses which have continuous lower plinth, we simulated the scenario of the most likely damage development of under-crane secondary trusses.

The first scenario is the development of cracks along the total cross section of plinth. In the process of calculations we defined a real deformation scheme of plinth of under-crane secondary trusses with damage and its stress condition.

The second scenario is the destruction of a support or support mounting unit to the lower plinth of under-crane secondary trusses. The destruction of this kind can occur as a result of a crack in a support or as a result of destruction of high-strength fasteners of a support to plinth. We discovered that a system with such damage is geometrically unchanged; there is no possibility of sudden destruction of both the under-crane secondary trusses and the entire building frame.

The third scenario is the upper plinth separation from one of the walls of lower plinth of under-crane secondary trusses.

The scenario is developed to define the viability of under-crane secondary trusses as a result of cracks in the area of wall junction with the upper shelf of lower plinth, their further development and the appearance of discrete cracks developing into a backbone along the entire span length of under-crane secondary trusses.

Based on the calculations of the stress strain state of under-crane secondary trusses with damages in the emergency nature in a separate span of the lower plinth and a truss member, we estimated the viability of structure. The analysis of viability limits makes it possible to find the measures of collapse preventing and avoid possible victims.

**Key words:** secondary truss of crane, progressive collapse, fatigue damage, scenarios of damage, stress-strain state.

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About the authors: **Eremin Konstantin Ivanovich** — Doctor of Technical Sciences, Professor, Department of Testing of Structures, **Moscow State University of Civil Engineering (MGSU)**, 26 Yaroslavskoe Shosse, Moscow, 129337, Russian Federation; moscow@weld.su;

**Shul'ga Stepan Nikolaevich** — postgraduate student, Department of Testing of Structures, **Moscow State University of Civil Engineering (MGSU)**, 26 Yaroslavskoe Shosse, Moscow, 129337, Russian Federation; Kornel22@list.ru.

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