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Fire resistance of galvanised members

The main task of a structural engineer is to decide, which material will be used for a building structure in accordance with the costs, requirements of investor and architect or type of the structure. Costs of the structure involve also costs of fire protection. Therefore is desirable to minimize quantity of fire protection, used on the structure, for maintaining competitiveness of steel structures with other materials.

Reduction of a fire protection amount is related to understanding of heat transfer into structure during fire. This heat transfer is dependent of surface emissivity. Adjusting the surface emissivity can be obtained lower temperature in steel members during a fire.

Heat transfer into steel member during fire consists of three parts – conduction, convection and radiation. The conduction is neglected, because a member in fire is heated equally and there is no temperature gradient, which is needed for heat conduction in a steel member. Convection is dependent on the type of fluid flow and is not constant during fire. It can be very difficult to specify exact value of energy, which is transferred by convection. The main way of heat transfer into steel members during fire is radiation. Radiation is directly proportional to surface emissivity. We can reduce emissivity of steel member by surface finishing. The best way is to galvanize steel members. Galvanizing than can be used as anticorrosion and also fire protection.

This contribution deals with description of heat transfer into structure during a fire, possibility of reduction surface emissivity with galvanising, shows performed experiments with particular results and recommends future experiments.