

MATHEMATICAL MODEL OF FIRE ESCALATION IN ADJACENT ROOMS

The article focuses on identification of (1) the level of damage of structures exposed to fire loads and (2) their "residual" bearing capacity in the aftermath of fires. Silicate brick masonry is selected as the sample cladding structure. The co-authors have developed model parameters for the gas medium in case of a fire developing into a system of adjacent rooms. The model helps assess the pattern of development of factors of fire hazards and determine the temperature effect produced on structures, depending on the gas medium density in the room needed to identify the post-fire technical condition of elements of buildings made of silicate bricks and to assess the feasibility of their further operation.

The authors employ mathematical models to obtain simple calculation methods aimed at determination of the extent of structural failure (bricks) and the "residual" bearing capacity of structures to:

1. provide their recommendations to fire departments;
2. determine the true limits of the fire resistance of building structures within the parameters of a 'real' fire, calculate the required thickness of flame retardants;
3. make inspection of structures after a fire in order to assess the feasibility of their further operation, if visual inspection of the extent of destruction is impossible;
4. depending on the extent of damage to the masonry, make adequate decisions concerning the structural restoration.

Key words: fire, model, fire escalation pattern, lime-sand bricks, hazardous factors of fire.

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