STRAIN RATE EFFECT ON DEVELOPMENT LENGTH OF STEEL REINFORCEMENT: STATE OF THE ART REVIEW

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Accidental or premeditated explosions have detrimental effects on infrastructure in the vicinity of the centre of explosion and pose major threats to human life. Thus, a lot of research is currently underway to study the effects of explosions on infrastructure systems with an ultimate goal of minimizing infrastructure damage and saving lives. Since reinforced concrete is the most common building material used in blast resistant infrastructure design and construction, understanding the effect of blast loads on reinforced concrete components is vital.

The design philosophy of critical infrastructure systems is energy dissipation through reinforcement yielding (ductility). Thus it is essential to preclude non-ductile failure modes such as shear and bond failure modes. This paper presents a state of the art review of strain rate (blast load) effects on the bond between concrete and reinforcement. The effect of strain rate on strength characteristics of concrete and reinforcement are discussed. The current state of knowledge and research on the effect of bond characteristics under high strain rate are presented together with details of an experimental research program. Experimental results from the investigation of blast load effects on steel reinforcement bond characteristics in concrete beams through shock tube testing are discussed and analyzed.