Please read and send in as full a discussion as possible at earliest date.

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FORMULAS FOR REINFORCED CONCRETE BEAMS.

By Henry Goldmark, M. Can. Soc. C. E.

(Read before the General Section, February 22, 1906.)

The rise of reinforced concrete is, perhaps, the most interesting phenomenon of the past decade in the field of constructive engineering. Since the introduction of Bessemer and open hearth steel into bridge building, twenty years ago, there has been no invention of equal importance to the civil engineer and architect.

Apart from bridges of very long span, there is hardly a branch of heavy construction to-day in which concrete, with or without metallic reinforcement, is not largely employed in place of timber, cast iron, steel or masonry.

This development, as is well known, is of very recent growth. Even ten years ago concrete steel construction was quite in its infancy. To-day only the most conservative engineers rule it out altogether, although there is naturally much difference of opinion as to its proper field. So rapid a rise is in itself a proof that this new material must possess many advantages. Its strong points are indeed not far to seek.

Advantages of Reinforced Concrete.—Reinforced concrete combines the resistance to fire and the low cost of maintenance which we find in the best masonry, with great tensile as well as compressive strength. It has also a comparatively high degree of elasticity, so that it can be deformed considerably without fracture, a property of the utmost importance in a structural material.