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Guest Editorial

In fiber reinforced concerete, fibers and cement-based matrices can be combined and processed in almost an endless number of ways to produce engineered composites suitable for a host of applications. This has allowed fiber reinforced concrete to emerge as a mainstream construction material with substantial industry-wide interest. Fibers do not require any specialized mixing techniques and are able to eliminate one of the most severe deficiencies of concrete: its poot fracture toughness and low strain capability.

By one estimate, over 140 000 metric tons of fibers are used in concrete annually, and perhaps more importantly, the industry is growing at an impressive rate of nearly 5% per year. In spite of this spectactular growth, I believe that we have only scratched the surface so far, and much remains to be done. Fibers continue to be used only in non-structural or semi-structural applications and yet we all agree that their use in truly structural applications in conjunction with continuous reinforcement produces a far superior solution. Fibers may eliminate the need for congested shear reinforcement in seismic applications and provide the much needed penetration and scabbing resistance in impact loaded structures.

In the same vein, it it also generally agreed that a proper choice of the fiber, matrix and the processing technique may produce a composite which is highly tenacious and durable under severe conditions of both environment and loading. There are a great number of applications (machine foundations, abrasion resistance overlays among others) where these attributes of fiber reinforced concerete are highly desirable, and focused efforts will allow these promising applications to develop further.

Before we can realize the full potential of this material, however, we all have to agree on uniform test procedures that can be adopted by standardizing bodies. Until this is done, data will remain scattered and confusing with little comparability between different test sets. Static toughness testing is a good example of this where a disagreement between the precisionists and the practical-minded has so far only resulted in an impasse with little apparent progress. Impact testing is another example, where influence of machine characteristics and specimen geometry, etc., are only poorly understood and the data may even become a representation more of the test technique than that of the true material performance. There is a critical need to resolve these issues through continued initiatives and exchanges.

This Special Issue contains papers by some of the most active researchers in the field of fiber reinforced concrete. There are eight papers in this issue. The first six are related to performance of fiber recinforced concrete under severe conditions of loading and environment. The remaining two are related, respectively, to toughnes and a specialized process of producing composites using filament winding technique. Collectively, these papers are a snapshot of contemporary research activity in this field, and provide a strong impetus for addi-

tional research. It is hoped that they will stir an active debate, and better still, result in novel applications.

I would like to express my deep appreciation to each one of the authors for their very useful and timely contributions. Thanks are also due to all the reviewers, who should remain anonymous, for their time and advice. Finally my sincere gratitude to Prof. Swamy for giving me this opportunity.

Nemkumar Banthia

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