

Ain Shams University
Faculty of Engineering

**THE FAILURE BEHAVIOUR OF
HIGH STRENGTH CONCRETE BEAMS**

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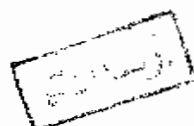
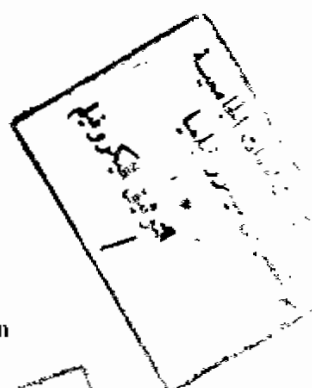
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To My Father

To My Mother

To My Son and My Wife

To My Brothers

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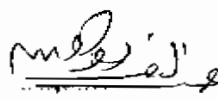
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The first part of the paper discusses the importance of the research and the need for a new approach. It then presents a detailed analysis of the current state of the field, highlighting the strengths and weaknesses of existing methods. The second part of the paper introduces a new method, which is based on a combination of advanced techniques. This method is then applied to a series of experiments, and the results are compared with those of the existing methods. The final part of the paper discusses the implications of the findings and suggests directions for future research.

The research presented in this paper is a significant contribution to the field of [specific field]. It provides a comprehensive overview of the current state of the field and introduces a new method that has the potential to revolutionize the way we approach [specific problem]. The results of the experiments conducted in this paper are highly promising and suggest that the new method is a significant improvement over the existing methods. This research is a valuable resource for anyone interested in [specific field] and provides a clear path forward for future research.

The new method introduced in this paper is a combination of [specific techniques] and [specific techniques]. This combination allows for a more accurate and efficient analysis of [specific data]. The results of the experiments conducted in this paper show that the new method is able to [specific results] and is a significant improvement over the existing methods. This research is a valuable resource for anyone interested in [specific field] and provides a clear path forward for future research.

The implications of the findings presented in this paper are far-reaching. They suggest that the new method is a significant improvement over the existing methods and has the potential to revolutionize the way we approach [specific problem]. This research is a valuable resource for anyone interested in [specific field] and provides a clear path forward for future research.

STATEMENT

This Dissertation is submitted to Ain Shams University, Faculty of Engineering

The work included in this thesis was carried out in the department of Structural Engineering, Faculty of Engineering, Ain Shams University, from June 1990 to June 1996.

No part of this thesis has been submitted for a degree or qualification of any other University or Institution.

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ABSTRACT

An experimental and theoretical investigation work was conducted to study general deformational behaviour of reinforced high strength concrete beams under pure flexural moments using silica fume. Different silica fume to cement content ratios were studied.

The beams were simply supported with span 2.4 ms and cross section 0.12 x 0.25 ms and tested under the effect of two concentrated loads with spacing of 0.6 m .

These beams represent four groups G1, G2, G3 and G4 with different ratios of silica fume to cement content. The values of silica fume-cementation ratios for groups were (0.0 , 5.0 % , 10.0 % , 15 %) respectively .

Each group consists of nine beams with three different values of percentage of steel reinforcement 0.5 % ($2\phi 10$), 0.9 % ($2\phi 13$) and 1.3 % ($2\phi 16$). Each value of steel percentage represents three beams with three different spacing of 6 mms stirrups 5.0 cm, 12.5 cm and 20.0 cm .The top reinforcement of beams was kept unchanged and equal to 0.34 % of concrete area ($2\phi 8$) .

The general deformational behaviour of the tested beams were examined and reported (cracking, crack propagation, deformations, strains).

In the theoretical phase of this thesis, these beams were analyzed using the finite element method, taking into consideration the nonlinear stress- strain curve of concrete and steel.

Finally the results of this investigation were combined with other available information to formulate some recommendations for the analysis and design of this type of structures.

Key words: High strength concrete, Silica fume, Behaviour, Silica Fume-cementations ratio, Steel ratio, Spacing of Stirrups, Finite Element, Material Nonlinearity.

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