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Rock-Concrete Structures

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Stanislaw Dominas, born 1931, received his civil engineering and MSc. degree from the University of Wroclaw in 1957 and Doctor degree in 1975. He has designed and realised many buildings during his professional work. In 1966, he had started didactic and research works in the University. Presently, he manages an own research enterprise of building structures.

Abstract

Compression strength of special concretes for high loads will yet not reach a higher value than $R_c=40-60\text{Mpa}$ in engineering practice. Further efforts to increase this strength will be determined with an unproportionated way by the cement binder even at its proper modification as a concrete composite matrix.

In a concrete composite, this cement matrix is the main cause of an unfavorable concrete creep and it is impossible to reach a better use of its load-carrying component i.e. rock aggregate.

In the same time, compression strength of basic rocks used in building technology such as basalt, porphyry and even granite is in fact quite sufficient for future structural needs.

Strength of these materials is equal to $R_c=200-400\text{Mpa}$ and in structures made from traditional concretes is used in 10 - 20% only. Therefore there are carried out actions to apply solid rocks into compressed area of concrete beam cross-section instead of concrete. Such solution will multiply the beam load - carrying ability. It concerns cross-sections of concrete columns, arches and especially beams submitted to bending.

In the paper, principles of creation of rock-concrete structures and promising results of tests carried out on columns and beams are shown. The subjected solution is worthy to be considered by a wider group of investigators and creative designers operating in the building branch because rock-concrete structures may be very useful in cases wherein high loads have to be carried out therefore in objects of the future.

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