SYNOPSIS

The present investigation is aimed at studying the behaviour of two-way reinforced concrete slab panels in flexure with and without restrictions to the edge displacements at supports. Such a phenomenon is very commonly found occurring in actual construction - particularly in prefabricated reinforced concrete construction, interior slab panel of a slab-beam monolithic construction, etc.

The discrepancy between the actual load carrying capacity of the slab element in construction and their flexural strength calculated by conventional Johansen's yield line theory may be attributed to a few basic assumptions made in the analysis. These assumptions are stated and their limitations discussed. Strength of a reinforced concrete slab in bending depends on the flexural strength of the internal of panel and influence of inplane stiffness provided by peripheral strip of slab panel or adjoining slab panels or by the peripheral beams.

There is almost no literature regarding the contribution of peripheral strip in the behaviour of slab panels. Also not many research reports are available in the area of reaction distribution along the edges, and available information is incomplete because of the lack of experimental investigation. Behaviour of slab panels with restriction to edge displacement at supports (without restricting the

rotation at support) does not seem to have received much attention in the past. Hence these areas are being undertaken for investigation.

Experimental part of the work consists of the test results of 15 two-way reinforced concrete slabs and 3 one-way spanning slabs tested to destruction. The tests were planned to study the overall behaviour of different kinds of slabs and the effect of following variable parameters (i) percentage of main reinforcement (ii) the length to breadth ratio and (iii) extent of restraint to end displacement. Simply supported end condition with uplift prevented of all four corner was achieved for all the two-way slabs.

As a result of these studies, certain broad inferences can be made. A simply supported reinforced concrete slab carries much more load that can be predicted by conventional Johansen's yield line theory because the inplane stiffness of the peripheral strips of the slabs has a considerable effect on behaviour of two way reinforced concrete slabs. This effect is predominant for lowly reinforced slabs. The presence of imposed restrictions to the edge displacements further increases the carrying capacity and decreases the deflection of the slab element. Such increase in carrying capacity would be more predominant in lowly reinforced slabs.

Theoretical analysis is carried out for two-way slab with restriction to edge displacement without restricting the rotation of the edges. Theoretical analysis is capable of dealing with slabs where horizontal edge displacements are completely or partially restricted. A general agreement of the theoretical and experimental work is observed.