International Journal of Civil Engineering
(IJCE)
ISSN (P): 2278–9987; ISSN (E): 2278–9995
Vol. 15, Issue 1, Jan–Jun 2026; 29–34

International Academy of Science,
Engineering and Technology
Connecting Researchers; Nurturing Innovations

OPTIMIZATION OF CELLULAR BEAM BY SPANS, LOADS AND OPENINGS AS VARIABLE PARAMETERS

Dr. Vikas Gandhe

Structural Engineer

ABSTRACT

Providing circular openings in the web of standard I-sections is a well-established method of fabricating cellular beams. The depth of the original I-section is increased without changing its self-weight, which improves both the bending and shear strengths. The diameter of the openings and their centre-to-centre spacing govern the maximum strength developed by the cellular beam. In this paper, three different spans — short (6.0 m), medium (9.0 m) and long (12.0 m) — are considered. To investigate the maximum strength, uniformly distributed loads of 10 kN/m, 15 kN/m, 20 kN/m and 25 kN/m are applied on ISMB 250, ISMB 350 and ISMB 450 sections respectively. Adopting the concept of one span – one section – four loadings, bending strength, shear strength and deflection are computed for all three spans. A total of 84 cases are obtained and compared with the standard permissible values. The results, presented in tabular form, are intended to be useful to practising field engineers, working contractors and students of structural engineering.

KEYWORDS: *Cellular Beam; Mode of Failure; Deflection; Spacing of Holes; Bending Moment*

Article History

Received: *12 May 2026* | ***Revised:*** *15 May 2026* | ***Accepted:*** *19 May 2026*
