

Proceedings of the 3<sup>rd</sup> Annual World Conference  
of the Society for Industrial and Systems Engineering,  
San Antonio, Texas, USA  
October 20-22, 2014

## **Evaluation and Comparison of Performance of the Shifting Bottleneck and Local Search Methods in Solving Job Shop Problems**

**J. Sánchez, C. Marmolejo-Barraza, R. M. Reyes-Martínez, and H. Hajar-Rivera**

División de Estudios de Posgrado e Investigación  
Instituto Tecnológico de Cd. Juárez  
Ave. Tecnológico # 1340  
Cd. Juárez, Chih., CP 32500 Mexico

Corresponding author's E-mail: [jsanchez@itcj.edu.mx](mailto:jsanchez@itcj.edu.mx)

**Author Note:** The authors are professor in the Master of Science and Doctorate programs in industrial engineering at the Instituto Tecnológico de Cd. Juárez. But, the second Author who was student in the same Institution in the program of Master of Science in Industrial Engineering. The professors are authors and co-authors of a large number of international journals publications.

**Abstract:** The Job Shop (JS) scheduling problems consist of determining the optimal sequence of  $n$  jobs on  $m$  machines, which find applications in the production planning on manufacturing and service industry. The JS is considered an NP-hard. Most of the methods to solve this scheduling problem are heuristic and sometimes is difficult to decide which method is the recommended to find the best or optimal solution. This study deals with the Shifting Bottleneck (SB) and Local Search (LS) methods. The purpose is to compare and evaluate the performance of these two methods in solving the JS problem. This the optimization criteria of interest in the study were Makespan and Total Flow Time (TFT). Test problems were selected from the literature and classified into three groups; small medium and large, according to the number of Jobs and machines. The problems were solved using the Lekin® scheduler system and the values of the Makespan and TFT were recorded. The LS method resulted to be a better alternative for solving the JS scheduling problem.

*Keywords:* Shifting Bottleneck, Local Search, Job Shop, Scheduling