

Investigation of Seven Wastes Relationships in Textile Industry by Lean Manufacturing Technique of Waste Relations Matrix (WRM)

Muhammad Ali Khan

Assistant Professor & PhD Scholar,
Department of Industrial Engineering & Management,
Mehran University of Engineering & Technology, Jamshoro, 76062, Sindh, Pakistan
muhammad.nagar@faculty.muet.edu.pk

Awaiz Khatri

Associate Professor,
Department of Textile Engineering,
Mehran University of Engineering & Technology, Jamshoro, 76062, Jamshoro, Sindh, Pakistan.

Hussain Bux Marri

Meritorious Professor & Dean of Technology,
Department of Mechanical Engineering,
Benazir Bhutto Shaheed University of Technology & Skill Development (BBSUTSD),
Khairpur Mirs, Sindh, Pakistan.

Abstract

This paper aimed to investigate the relationships between seven deadly wastes (i.e. overproducing; process; inventory; transporting; defects; waiting and motion waste) of lean manufacturing in textile industry. Waste Relationship Matrix (WRM) is used to investigate the wastes relationships. The percentages of wastes relationships are calculated to represent the probability that a certain type of waste will affect others or be affected by others. The bar graphs and pie charts presented the pictorial view of WRM score. The rankings of wastes either affecting or be affected are done. Defect (21%), waiting (15%), overproduction (14%), motion (13%), transportation (13%), process (12%) and inventory (11%) wastes are ranked as 1st, 2nd, 3rd, 4th, 4th and 5th affecting waste respectively. Inventory (20%), defect (19%), waiting (19%), motion (18%), overproduction (13%), transportation (10%) and process (02%) wastes are ranked as 1st, 2nd, 2nd, 3rd, 4th, 5th and 6th affected waste with respectively. The WRM results serve as guidelines for wastes elimination. This paper investigated the seven wastes relationships in textile industry therefore the other wastes relationships in textile & other industries can be investigated. This approach provides a method to investigate the wastes relationships which provides an insight to concentrate effort among the seven wastes.

Keywords:

lean manufacturing; Waste relations matrix (WRM); Wastes; Seven wastes relationships.

Acknowledgements

We are also very thankful to Dr. Shakeel Ahmed Shaikh (Associate Professor) at the department of Industrial engineering and management, Mehran UET, Jamshoro, Sindh, Pakistan to guide us in the data collection and lean manufacturing standard procedures. We acknowledge the use of questionnaire which was initially used by Mr. A. Rawabdeh of University of Jordan and later modified and reused by Mr. Abu Shaaban of The Islamic University of Gaza. We also acknowledge Dr. Anabela Alves of University of Minho, Portugal for responding to our questions and providing the guidance regarding the applications of lean manufacturing in textile industries. We also acknowledge the to Mr. Wali of Sapphire and Mr. Adnan for their administrative and technical support throughout

the process in general and specially in the data collection & data analysis process. We are also very thankful to the administrative and technical support from the administration & management of Mehran UET, Jamshoro, Sindh, Pakistan for their cooperation and support.

Biographies

Muhammad Ali Khan currently works as Assistant Professor in the Department of Industrial Engineering and Management, Mehran UET, Jamshoro, Sindh, Pakistan. He has sixteen years university teaching experience. He has supervised more than a dozen theses at undergraduate level. He is pursuing his PhD in the same department. He has completed his Bachelor of Engineering, Post Graduate Diploma and Master of Engineering in Industrial Engineering and Management. He has also completed his MBA in Industrial Management from IoBM, Karachi, Pakistan. He has authored various research papers for conferences and journals. He has participated in many professional seminars, workshops, symposia and trainings. He is registered with Pakistan Engineering Council and many other professional bodies. He does research in diversified fields of Industrial Engineering. The current projects are related to Lean manufacturing, Six Sigma, Project management, Operations management; MIS and Entrepreneurship. He has also earned various certifications in his areas of research.

Dr. Awais Khatri currently works as Professor in the Department of Textile Engineering, Mehran UET, Jamshoro, Sindh, Pakistan. He is PhD from RMIT University, Australia. He is an approved Supervisor, an expert inspection evaluator and member of NCRC by HEC Pakistan. He is a Professional Engineer (PEC), Program evaluator & master trainer for PEC accreditation as per OBE System. He is Chartered Textile Technologist & Associate of The Textile Institute UK and offered Fellowship at Licentiate of the Society of Dyers & Colourists, UK. He has one registered patent for sustainable fashion clothing, Impact Factor of 62.621 and GSCR of 462. He has supervised numerous B.E. and 12 M.E./M.Phil. theses and participated in various Courses, Trainings and Workshops. He has won many research awards & grants. He has various publications, Conference Proceedings/Abstract, Books, Textbooks/Monographs, International Book Chapters, and Practical Workbooks. He is the active member of many Professional bodies.

Dr. Hussain Bux Marri currently works as Professor in the Department of Mechanical Engineering Technology, Benazir Bhutto Shaheed University of Technology & Skill Development, Kairpur Mirs, Sindh, Pakistan. He has served as Professor and Chairman in the Department of Industrial Engineering & Management, Mehran UET, Jamshoro, Sindh, Pakistan. He is PhD & Post-Doc from Brunel University, UK. He has over 38 years of teaching experience. He is also awarded as “Best teacher” and “Meritorious Professor” from HEC Pakistan. He has served as Member in PEC, HEC and NCRC HEC, Pakistan. He has supervised many B.E, M.E and PhD theses. He has participated in various Courses, Trainings and Workshops. He has won many research awards & grants. He has various publications, Conference Proceedings/Abstract, Books, Textbooks/Monographs, International Book Chapters, and Practical Workbooks. He has high impact factor and high google scholar citation index. He is the active member of many professional bodies.