

E-BOOK OF EXTENDED ABSTRACT

THE 14TH INTERNATIONAL INVENTION, INNOVATION & DESIGN COMPETITION 2025



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Organized by:

Office of Research, Industry,
Community & Alumni Network
UiTM Perak Branch

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Perpustakaan Negara Malaysia

Cataloguing in Publication Data

No e- ISBN: 978-967-2776-52-9

Cover Design: Dr. Mohd Khairulnizam Ramlie

Typesetting : Georgia

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ERGONOMIC DESIGN OF A PORTABLE TILE INSTALLER FOR TILING WORKS

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ABSTRACT

Tile installation entails the systematic and careful placement of tiles on a prepared surface with suitable materials. This procedure encompasses measuring and cutting tiles to the specified dimensions, making an appropriate cement mortar or glue, arranging tiles meticulously, and ultimately scrubbing and cleaning the tiles to achieve superior quality. In construction, tile installation is a crucial element in creating an aesthetically pleasing and robust building structure. Nonetheless, tile installation necessitates a significant degree of proficiency. For instance, tile cutting and tile installation. Consequently, we have created and engineered a tile installation station solution that addresses this issue. A tile installation station is a device that facilitates the application of adhesive to the surfaces of floors repetitively with enhanced precision and efficiency. This product is user-friendly and does not necessitate advanced experience. This product can enhance tile installation tasks. The materials utilised in the development of this product include C-channel and aluminium plate. This product employs a gear mechanism to modify its height. This device can expedite tile installation. Furthermore, this product is user-friendly, and the tile installation will be more orderly. This product can significantly influence the construction industry.

Keywords: portable, tile installer, tiling works, ergonomic design, repetitive

1. INTRODUCTION

This project was developed and transformed into a new product. The concept for product development was inspired by the experiences of researchers involved in the national skills competition. Tile installation necessitates considerable knowledge for the precise cutting and placement of tiles. Consequently, the concept emerged to create a solution that may address that issue. The concept of a tile installation system emerged from the necessity to enhance conventional methods that are frequently laborious, unreliable, and demand advanced skills. The following are the principal causes that catalysed the inception of this concept: efficacy and velocity. The primary motivation is the necessity to expedite the tile installation process, particularly in extensive construction projects. Contemporary techniques, including tile installation systems, facilitate expedited tile installation and reduce the necessity for repairs. The consistency and quality of tiles that are laid irregularly or exhibit unequal gaps can compromise the final outcome. The concept of a tile installation technique was developed to create a more uniform, level, and smooth surface. Moreover, cost reduction and tile installation systems diminish reliance on expert labour and curtail material waste. This concept emerged to assist contractors and individuals in conserving time and reducing expenses. Ultimately, these variables culminate in advancements in tile installation methods and tools, enhancing ease, efficiency, and quality. This product can significantly influence the construction industry.

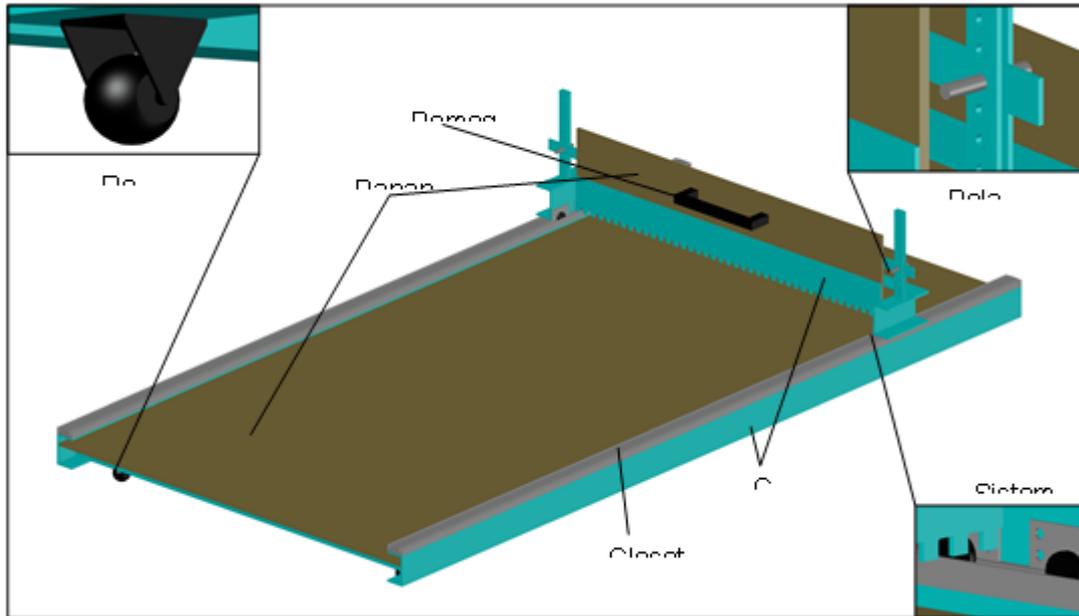


Figure 1 Ergonomic design of a portable tile installer for tiling works

2. METHODOLOGY

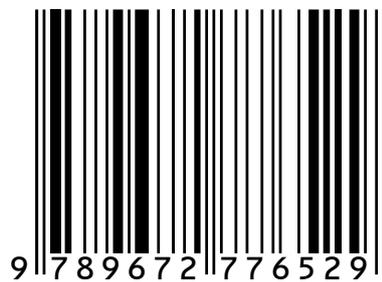
The goal of Design and Development Research (DDR) is to solve particular problems or enhance practices in a particular field by methodically designing, developing, and assessing products, processes, or interventions. DDR is frequently utilised in education, technology, and social sciences to generate practical and broadly relevant outcomes. DDR is a methodical and thorough approach to model or curriculum creation, commencing with needs analysis, followed by design, production, and evaluation of the final output. The process for executing a tile installation system project per DDR has three primary phases: the needs analysis phase, the design and development phase, and the evaluation phase.

3. FINDINGS

The diagram illustrates the percentage of respondents pertaining to the second question. The study's results indicate that 45 percent of respondents reported that the tile installation was highly satisfactory. Merely 10 percent provided unfavourable ratings, and no respondents selected very unsatisfactory. The tile installation was satisfactory. A minority of respondents provided unsatisfactory feedback. In conclusion, 90 percent of respondents expressed satisfaction with the quality of the tile installation regarding neatness and alignment.

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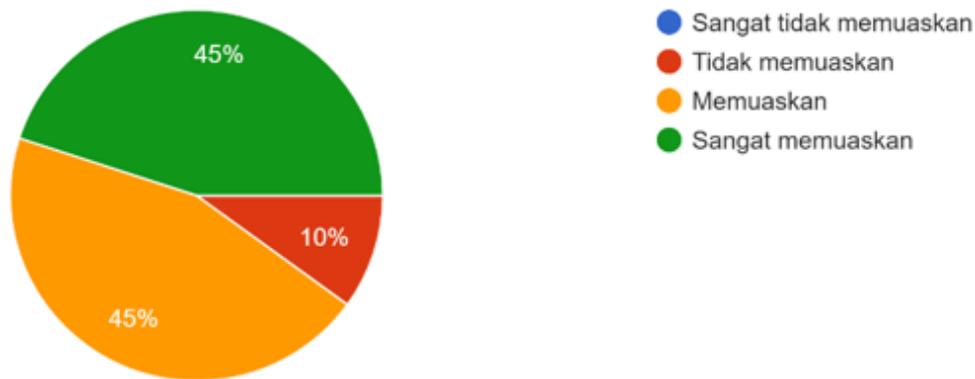


Figure 2 Usability and simulation

4. CONCLUSION

The Portable Tile Installer for Tiling Works project has successfully met its aims of enhancing the accuracy, efficiency, and productivity of the tile installation process. The technology has effectively diminished installation faults and enhanced the utilisation of labour and supplies. Despite existing obstacles and deficiencies, enhancements can be achieved by advancements in automation technology and system adaptability. The proposed enhancements position this method for extensive application within the construction sector, hence facilitating progress in tile installation technology. This initiative has significantly enhanced the efficiency of tile installation and has created prospects for further innovation in construction innovation.

REFERENCES

Bottazzi, M. (2012). *Ergonomic rolling structure for laying tiles*.