

# Implementation of Intz Water Tank in Malaysia Water Supply

MA Azizan<sup>1\*</sup>, N.Z.Noriman<sup>2</sup>, N. Ishak<sup>3</sup>, H Desa<sup>4</sup>, ZM Razlan<sup>5</sup>

1,3 Faculty of Civil Engineering Technology, Universiti Malaysia Perlis,  
P. O. Box 77, d/a Pejabat, Pos Besar, 01000 Kangar, Perlis, Malaysia

2,4,5 Faculty of Mechanical Engineering Technology, Universiti Malaysia Perlis,  
P. O. Box 77, d/a Pejabat, Pos Besar, 01000 Kangar, Perlis, Malaysia

\*Corresponding author's email: aziziazizan@unimap.edu.my

**ABSTRACT:** Elevated water tanks are an essential component of any town or city's lifeline facilities. They are used to store water for various purposes, such as drinking etc. and are vulnerable to earthquakes because of the slender stage of mass. This study focuses on the implementation of Intz Water Tank in Malaysian new township. The data were obtained from observations and questionnaires that have been conducted through the selective respondents. Findings conclude that the variations population polar become the reason of water tank selection types in a project. However, there were several alternative recommendations from respondents to tailored the selection of water tank.

**Keywords:** *Water Tank; Hybrid Material; Intz Tank*

## 1. INTRODUCTION

Much of the urbanisation process, both in Europe and abroad, is influenced by demographic change (including internal and international migration) and economic growth factors (Cheshire and Carbonaro, 1996, Skeldon, 2006 and Makropoulos et al., 2008). This has major ramifications for the (Suruhanjaya Pembekalan Air Negara) SPAN strategy, which estimates that over 8 million new houses would be required by 2020. This concentration of human activity intensifies local competition for all types of resources, including water, which is one of the most important (Zoppou, 2001), making it more difficult to identify and use new sources of water to meet expanding water demand (Niernczynowicz, 1999). Water management solutions for new residential developments, it is argued, should be based on sustainability considerations because of their far-reaching social, economic, and environmental implications (Fenner et al., 2006, Makropoulos et al., 2006a, Makropoulos et al., 2008). The use of sustainable practises in the urban environment is based on a variety of development-specific aspects, which necessitates the thorough consideration of both quantitative and qualitative data (Makropoulos et al., 1999). This requires the development of appropriate decision-making support tools to help decision makers to address the unstructured nature of the sustainable assessment process, assess its

components and interactions, explicitly state their assumptions and increase stakeholder communication, including researcher communication (Jakeman et al., 2006).

## 2. RESEARCH METHODOLOGY

The research methodology is important to guide achieving the research objectives which consist with the data collection methods. Data collection methods will through by two ways such as questionnaires and observations. Research sites chosen will be the main data sources and the research begins with the research title selection.

## 3. INTZ WATER TANK

According to Singh et al. (2015), an elevated circular tank with a flat floor slab is an uneconomical design for storing large volumes of water. Especially since the floor plate becomes too thick for large diameter tanks. In such cases, the intz tank is the best option. Essentially, an Intze tank is made up of a conical dome at the top as well as a conical dome and a conical dome in the lower part. Domiciliary floors undergo direct compression, resulting in a significant reduction in thickness, making them a more cost-effective option than a flat slab flooring. As a result of their proportions, the conical dome and bottom dome balance each other outwardly and inwardly.

## 4. WATER SUPPLY

Water supply management, also known as supply-side management, focuses on actions that improve or increase the capacity of a water resource or water system to supply water, such as interstate water transfer, new water treatment plants, and pipe replacement. The focus is on the supply side and the assessment of available water resources, rather than managing demand, which is considered a typical strategy of hydrologists and water managers. Until 2006, the federal and state governments in Malaysia shared responsibilities for ensuring a constant supply of water. The federal government is responsible for infrastructure projects, while the state government is responsible for water resources, water supply, and services, according to Malaysia's Federal Constitution's Ninth Schedule.

## 5. FCP RESERVOIR WATER TANK AS FUTURE

## DEMAND

For this questionnaire, there are 10 respondents who willing to participate and kindly give their support by answering the entire question. There are four parts or sections that been asked for the respondent to answer. Part A indicates general information of the respondents. Most of the respondents are graduates and professional background because the questionnaires were distributed among researcher's working field. It is due to time constraint faced in completing the task. Next, regarding length of experience that respondents have been involved in Malaysian construction industry in new township development and water tank constructions.

According to respondents, length of time i.e the experience that respondents have in Malaysian construction had represented by 2 respondents for each of the three categories which are less than 1 year, 2-5 years and more than 10 years of experience. Then, 4 numbers of respondents have 6 to 10 years' experience involving in related industry. Next question is regarding length of time that respondents had involved with Water Tank Design and Build projects. The objective of this question is to ensure that the respondents have an ample and sufficient experience to respond to the related questions required.

The first question that been asked is regarding methods of water tank identification. 100% of respondents which is means all of them agree that brain-storming, choose analysis of historical data for similar projects and industrial check lists are the most significant methods that contributed to identify types of water tank in a project. It shows that all of these three methods have a same level of prominent in water tank selection and most preferable in Intz type. Next question is regarding respondent's knowledge and experience on water tank selection and decision process.

Most of the respondents strongly agree that cost management have affected the process of identifying the water tank. They also clarify that the process of water tank selection is measured standard for large and highly depending on population. For large and highly visible projects, it is often to see that they have their own consideration in order to find the best way to forecast for a project. The majority of respondents identified the contractor as the party most often involved in the final decision regarding the water tank in projects. This is supported by the delivery scheme's concept of single point responsibility. Furthermore, once the contractor is bound by the project contract, the burden and risk that were allegedly carried by the client are transferred to the contractor. In contrast, 20% of respondents stated that the client is usually dealing with risks because a large sum of money has been invested in a project. For the next issue, respondents were asked to rank different types of water tanks in project decision making based on the frequency with which they arose.

60% of the respondents claimed that Intz type is one of the common selections of water tank that frequently happen in a new township project in Malaysia. Followed

by OHSR Elevated Tank was selected by 20% of respondents, with 10% selecting each type of water tank, on the ground or underground. Finally, in Part D, respondents' knowledge and information pertaining to risk control and management were elicited in order to identify the most appropriate way to make the decision and selection of the water tank that integrated with the water supply process, as well as in the general Malaysian construction industry (MA Azizan, 2015).

Water tank selection is not fully implemented at the beginning of the project, which has a significant impact on the project's success rate. Additionally, it has been decided to exclusively use the method in the case of significant, high-profile projects. Most respondents with more than 10 years' experience in the associated project, however, regarded cost management induced by client-related modifications as the most important factor in water tank selection. Water tanks of the Intz type were found to be a popular choice for new medium and large-scale projects due to their ability to moderate project performance as it relates to the water supply cycle as a whole.

## ACKNOWLEDGEMENT

Authors are grateful to Universiti Malaysia Perlis for the financial support.

## REFERENCES

- [1] Makropoulos, C. K., Natsis, K., Liu, S., Mittas, K., & Butler, D. (2008). Decision support for sustainable option selection in integrated urban water management. *Environmental modelling & software*, 23(12), 1448-1460.
- [2] Azizan, M. A., & Ibrahim, F. A. (2015). Implementation of risk management in Malaysia design and build projects. *Advances in Environmental Biology*, 9(3), 108-111.
- [3] Azizan, M. A., Noriman, N. Z., Ishak, N., Hazry, D., Dahham, O. S., Umar, M. U., & Jaya, H. (2020, March). Application of coal bottom ash as raw material for concrete brick in housing construction. In *AIP Conference Proceedings* (Vol. 2213, No. 1, p. 020269). AIP Publishing LLC.
- [4] Singh, N. J., & Ishtiyaque, M. (2015). Design Analysis & Comparison Of Intze Type Water Tank For rent Wind Speed And Seismic Zones As Per Indian Codes. *International Journal of Research in Engineering and Technology*, 4(09).
- [5] Zoppou, C., 2001. Review of urban storm water models. *Environmental Modelling and Software* 16 (3), 195–231.C.K.