

CHAPTER I

INTRODUCTION

1.1. Background

Over 10 years the terrorist activities and threats have become the growing problem in Indonesia. Following the September 9th, 2004, vehicle bombing of the Australian Embassy in Kuningan, Jakarta, July 17th, 2009, bombing at the JW Marriott hotel and Ritz-Carlton hotel, Jakarta, until the most recent terrorist activities January 14th, 2016, explosions and gun fire near Plaza Sarinah, Jl. MH Thamrin, Jakarta Pusat.

As we already aware that terrorists were targeting the government buildings, embassies, hotels, but after a decade and a half of rolling waves of terrorist act across the world, these buildings are now harder to hit, so they've changed their target, over the last 13 months there has been a series of extremely bloody attacks on school, colleges and universities. On Wednesday 20 January 2016, Taliban suicide bombers mounted an assault in north western Pakistan; just over a year ago the same movement attacked a school only 30 miles away, killing 150 people, most of them children. In April last year 147 were killed in a massacre at a university in northern Kenya by the Somalia-based al-Shabaab. Easy to hit target is not only the reason why these terrorist begin to attack the educational institutions; terrorism aims to undermine the legitimacy and authority of a state. In many parts of the world,

the local school is that state's only tangible presence. Another goal is simply to stall educations, of both girls and boys, though the former tends to prompt a greater reaction. In 2012 the Pakistani Taliban tried to kill a 15 years old schoolgirl, Malala Yousuzai, who went on to become an international icon. This kind of events is not impossible will happen in Indonesia, since Indonesia now is more aware about the terrorism after recent incident.

Protection of the citizens against terrorist acts involves prediction, prevention, and mitigations of such events. In the case of structures an effective mitigation may also be thought in the terms of structural resistance and physical integrity. If the structures are properly designed for these abnormal loads damage can be contained. Additionally, in order to ensure safety of existing structures against such events, an evaluation procedure for their inspection and eventual retrofit is needed (Draganić and Sigmund, 2012).

Damage to the assets, loss of life and social panic are factors that have to be minimized if the threat of terrorist action cannot be stopped. Designing the structures to be fully blast resistant is not a realistic and economical option, however current engineering and architectural knowledge can enhance the new and existing buildings to mitigate the effects of an explosion (Kocczaz et al. 2008).

1.2. Problem Statement

The following research questions were formulated to further examine the problem statement:

1. How is the Universitas Atma Jaya Yogyakarta (UAJY) Library's response to external blast loading?
2. Does the Universitas Atma Jaya Yogyakarta (UAJY) Library current structure design can resist the blast loading that come from vehicle bombing?

1.3. Problem Limitation

1. The blast loading come out from the vehicle bombing.
2. The blast loading obtains by using software called AT Blast, software that based on the procedure proposed by Unified Facilities Criteria (UFC), Structures to Resist the Effects of Accidental Explosions, U. S. Army Corps of Engineers, Naval Facilities Engineering Command, Air Force Civil Engineer Support Agency, UFC 3-340-02, 5 December 2008.
3. The structure that will be analyzed is the Universitas Atma Jaya Yogyakarta (UAJY) Library. It is 23.1 meters tall, consisting of 4 stories and 1 basement.
4. The analysis will be carried out by ETABS 2015 (v.15.2.0).
5. The blast pressure will be applied at the front façade from stand-off distance 11.3 m and will cover the area corresponding the lethal air blast range from the vehicle from the table proposed by Department of the

Treasury Bureau of Alcohol, Tobacco and Firearms on ATF Vehicle Bomb Explosion Hazard and Evacuation Distance Table.

1.4. Objectives

When designing to resist blast loads, the engineer is faced with two principal challenges: firstly, the pressures associated with the blast wave and how it interacts with the target must be quantified; secondly, the response of the target should be calculated and subsequent damage predicted with some degree of confidence.

This Project, therefore, has two main aims, related to the two engineering challenges introduced above:

1. to investigate the form of blast pressure that occurs on the structure.
2. to gain better understanding of the influence of blast wave that occurs on the structure by seeing the structure response to the subjected load.

1.5. Final Project Originality

The topic “Universitas Atma Jaya Yogyakarta Library’s Structural Response to External Blast Loading” has never been used on any other final project before. Therefore, there has never been any attempt to analyze the damage caused by the blast loading for UAJY’s library. This final project will be a new project in its attempt to analyze the effect of the blast loading on UAJY’s library.