UNIVERSITI TEKNOLOGI MARA

THE RECONSTRUCTION OF TAIL BOOM DAUPHIN HELICOPTER 9M-IGB USING CLOSE RANGE PHOTOGRAMMETRY

SITI SAFARIAH BINTI MAHAT

Disertationsubmitted infulfillment
of the requirements for the degree of
Bachelor of Science
(Surveying Science and Geomatics)

Faculty of Architecture, Planning and Survey

January 2018

AUTHOR'S DECLARATION

I declare that the work in this disertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Under Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Siti Safariah binti Mahat
Student I.D. No.	:	2014286332
Programme	:	Bachelor of Science (Surveying Science and Geomatics) - AP220
Faculty	:	Architecture, Planning & Surveying
Thesis	:	The Reconstruction of Tail Boom Dauphin Helicopter 9M-IGB using Close Range Photogrammetry
Signature of Student	:	.....
Date	:	January 2018

ABSTRACT

Visualisation in 3-dimensional of an accident wreckage is limitedly used. This paper explores how a reconstruction of a body part Dauphin Helicopter AS 365 N3/9M-IGB which is the boom tail of the helicopter by using a Photogrammetry technique, the Close Range Photogrammetry (CRP) as a counter check of the investigation done by the Air Accident Investigation Bureau (AAIB). Images of the tail boom were taken from each side of the object in order to have a high quality three dimensional view. Prior investigations, the remaining of the helicopter was laid down and arranged in two dimensional in order to investigate the cause of the accident and to identify which parts of the helicopter was missing. Therefore, the aim of this study is to define the damages of the tail that cause the crash in 3d visual. This study is conducted to develop the tail in 3-dimensional using CRP, differentiate the 3d visual with the actual image and to distinguish the impact of the detached part of the tail. The three dimensional model is generated using Agisoft Photoscan software where the visualization is then compare and analyze using CAD software. In conclusion, a high accuracy of 3d image can be generated from a good orientation of a photo and with adequate light exposure.

TABLE OF CONTENT

	PAGE
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDMENT	v
TABLE OF CONTENT	vi
LIST OF TABLES	ix
LIST PF FIGURES	x
LIST OF SYMBOLS	xii
LIST OF ABBREVIATION	xiii
CHAPTER ONE: INTRODUCTION	1
1.1 Introduction	1
1.2 Research Background	1
1.3 Problem Statement	2
1.4 Aim And Objectives	3
1.5 Research Gap	3
1.6 Research Question	4
1.7 Study Area	4
1.8 Conclusion	5
CHAPTER TWO: LITERATURE REVIEW	6
2.1 Introduction	6
2.2 Reconstruction Of A Crash	6
2.2.1 Reconstruction Of A Crash In World Perspective	6
2.2.2 World's Aircraft Reconstruction	6
2.2.3 Aircraft Crash Investigation In Malaysia	7
2.3 Air Plane Accident Statistics	7
2.4 Why Plane Crash	8

2.5 Main Structural Componnent 8

Stabilizer 8

Rotor Blade 9

Tail Boom 9

2.6 Factual Information 9

2.6.1 History Of The Crash 9

2.6.2 Damages 10

2.7 CRP 10

2.7.1 Definition 10

2.7.2 Application In Aviation 10

CHAPTER 3 METHODOLOGY 11

3.1 Introduction 11

3.2 Methodology 12

3.3 Software 13

3.4 Camera Calibration 14

3.5 Data Collection 15

3.6 Data Processing 20

3.6.1 AGISOFT 20

3.6.2 AUTOCAD 25

3.6.3 PHOTOMODELER 25

3.7 Energy Calculation 25

3.8 Conclusion 26

CHAPTER 4 RESULT 27

4.1 Introduction 27

4.2 3D Modelling Of The Tail Boom 27

4.2.1 Tail Reconstruction 27

4.3 Differentiation With The Actual Image 32

4.3.1 Actual Image Reconstruction 32