

# Instructional Media for Using the Program Autodesk Robot Structural Analysis Professional

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**Abstract**—Nowadays, programs used in construction work are important in drawing and design. Several options are available. Design programs are two- and three-dimensional structural analysis and design programs which can analyze large and complex structures accurately and rapidly. Moreover, a design software can design various types of building structures and constructions. A video media of software tutorial was created to make teaching and learning more efficient and to easily understand how to use the program for accurate calculation, analysis and design by using the Autodesk Robot Structural Analysis Professional program. A steel structure warehouse with a dimension of 30 x 60 meters was chosen as an example in this study. The instructional media was produced to demonstrate the use of Robot Structural Analysis Professional software in analysis and design of the selected warehouse step by step. The instructional media was evaluated the effectiveness of the content by five experts. The revised instructional media according to the comments of the experts was tested by 34 students via pretest and posttest. The result was found that analysis for efficiency in production technical is in a very good level. Analysis for content performance is in a good level. Production technical satisfaction analysis is in a good level. The average score of content satisfaction analysis, test results, users, and media usage before studying was 8.176, and after studying was 14.294. The score after studying was statistically significant more than before studying at 0.05.

**Keywords**—structural analysis, building structures, instructional media

## I. INTRODUCTION

Currently, the program can be considered as a necessity for everyday work. Several programs are available to be used and each program has its own advantages. If the user does not have sufficient knowledge of the program, it may cause problems and errors.

Autodesk Robot Structural Analysis Professional is a 2D and 3D structural analysis and design program capable of analyzing large and complex structures accurately and quickly [1,2]. Able to design various types of building structures and constructions The structural steel structure Reinforced concrete, wood and aluminum as well.

Instructional media is necessary for teaching process [3]. To illustrate and explain the use of the program in each step for the learners to be able to understand more easily and efficiently, the researcher has prepared the video media. The media also gives an example and explain how to use the program step by step for the learners to gain more knowledge and understanding of how to use the Autodesk Robot Structural Analysis Professional program.

## II. EXPERIMENTAL PROGRAM

The instructional media of warehouse design with the size of 30 x 60 meters was produced using the Autodesk Robot Structural Analysis Professional software as follows [4]:

- Study information and procedures for using Robot Structural Analysis program.
- Determine the steps for using the Robot Structural Analysis program, divided into 10 steps as follows:

### 1) Set project type



Fig. 1. Set project type.

## 2) Various settings in the program

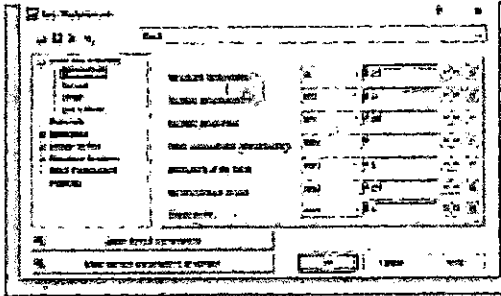


Fig. 2. Program settings.

## 3) Set axis definition

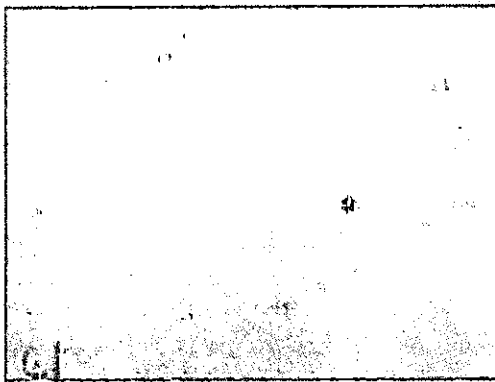


Fig. 3. Axis definition.

## 4) Define a bar section

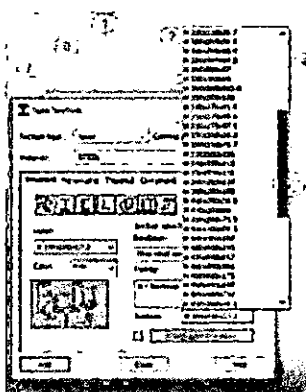


Fig. 4. Define section.

## 5) Create a 3D model

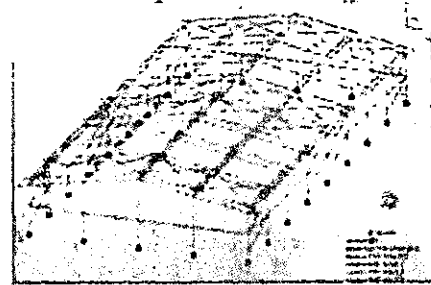


Fig. 5. 3D model.

## 6) Define supports

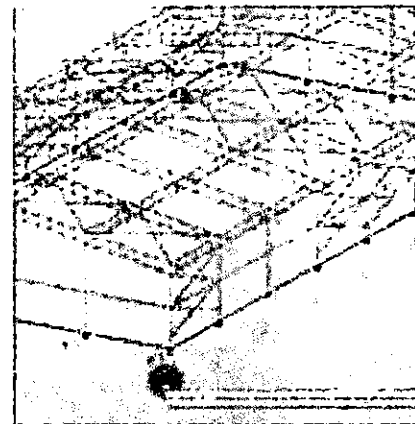


Fig. 6. Supports.

## 7) Load definition

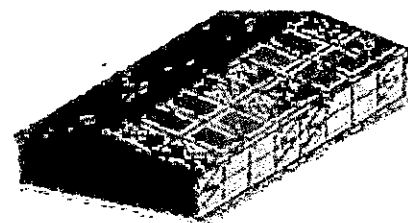


Fig. 7. Load definition.

## 8) Analysis

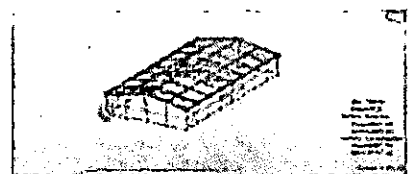


Fig. 8. Analysis.

### 9) Design



Fig. 9. Design.

### 10) Design report

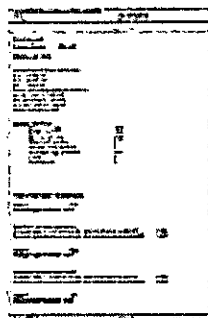


Fig. 10. Report.

- Produce instructional media for using Robot Structural Analysis program in video media.
- Evaluate the effectiveness of the material and technical teaching materials by experts and sample [5].
- Conclusion

### III. TEST RESULTS AND DISCUSSIONS

Analysis for efficiency in production technique. The criteria for interpreting the mean analyzes of the data shown in Table 1.

TABLE I. INTERPRETATION CRITERIA, MEAN MEAN LEVEL OF OPINION OF VIDEO MEDIA

Mean	Comment level
4.21-5.00	Very good
3.41-4.20	good
2.61-3.40	moderate
1.81-2.60	Fair
1.00-1.80	Should improve

Evaluation of the Efficiency of Instructional Materials in Production Techniques There are 5 experts evaluating using the evaluation results to find the mean which can be summarized as shown in Table 2.

TABLE II. SHOWS THE MEAN RESULTS OF ANALYSIS OF PRODUCTION TECHNICAL DATA

list	$\bar{X}$	Satisfaction level
Visual technique		
1. Suitability meets content	5.00	Very good level
2. Clarity of illustrations	5.00	Very good level
3. Image size in presentation	5.00	Very good level
list	$\bar{X}$	Satisfaction level
4. The relationship between picture and sound	4.50	good level
Sound technique		
5.Sound technique	4.50	good level
6. Clarity, sound accuracy	4.00	good level
7. Rhythm for reading aloud	4.00	good level
8. Language, or words that are easy to understand	4.50	good level
9. Proper reading patterns	5.00	Very good level
Alphabet technique		
10. Scale and read clarity	5.00	Very good level
11.Highlighting messages and key points	5.00	Very good level

Evaluation of the effectiveness of teaching materials for content. There are five experts evaluating using the evaluation results to find the mean, which can be summarized as in Table 3.

TABLE III. SHOWS THE MEAN RESULTS OF ANALYSIS OF CONTENT DATA

list	$\bar{X}$	Satisfaction level
1. Accuracy of content	5.00	Very good level
2. Content integrity	4.00	good level
3. Content resolution	4.00	good level
4. Correct order of procedures	4.00	good level
5. Explanation of operating procedures is clear.	5.00	Very good level

Evaluation of satisfaction of instructional media on production techniques a sample of 31 people evaluated by using the evaluation results to find the mean which can be summarized as in Table 4.

TABLE IV. SHOWS THE MEAN RESULTS OF THE PRODUCTION TECHNICAL SATISFACTION ANALYSIS

list	$\bar{X}$	Satisfaction level
Visual technique		
1. Suitability meets content	4.30	good level
list	$\bar{X}$	Satisfaction level
2. Clarity of illustrations	4.40	good level
3. Image size in presentation	4.60	Very good level
4. The relationship between picture and sound	4.40	good level
Sound technique		
5.Sound technique	4.00	good level
6. Clarity, sound accuracy	4.20	good level
7. Rhythm for reading aloud	4.40	good level
8. Language or words that are easy to understand	4.60	Very good level
5.Sound technique	4.30	good level
Alphabet technique		
10. Scale and read clarity	4.40	good level
11.Highlighting messages and key points	4.40	good level

Assessing the satisfaction of the instructional media content a sample of 31 people evaluated by using the evaluation results to find the mean which can be summarized as in Table 5.

TABLE V. SHOWS THE MEAN RESULTS OF CONTENT SATISFACTION ANALYSIS

list	$\bar{X}$	Satisfaction level
1. Accuracy of content	4.50	good level
2. Content integrity	4.60	Very good level
3. Content resolution	4.30	good level
4. Correct order of procedures	4.20	good level
5. Explanation of operating procedures is clear.	4.50	good level

Sample test the results of the pre- and post-training test were used to find the mean values by experimenting with 34 students was tested by taking 20 multiple-choice tests as shown in Table 6.

TABLE VI. SHOWS THE MEAN SAMPLE TEST RESULTS

	n	mean	S.D	t	Sig.
Pre test	34	8.176	2.066	16.538	0.00
Post test	34	14.294	3.186		

It was found that There was a statistically significant difference ( $t = -16.538, p = 0.00$ ).

#### IV. RECOMMENDATION

The study other structures authors would like to propose the preparation of teaching materials for concrete structural design. To guide further study of the use of the Autodesk Robot Structural Analysis Professional program.

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Nowadays, programs used in construction work are important in drawing and design. Several options are available. Design programs are two- and three-dimensional structural analysis and design programs which can analyze large and complex structures accurately and rapidly. Moreover, a design software can design various types of building structures and

teaching and learning more efficient and to easily understand how to use the program for accurate calculation, analysis and design by using the Auto Robot Structural Analysis Professional program. A steel structure warehouse with a dimension of 30 x 60 meters was chosen as an example in this study. The instructional media was produced to demonstrate the use of Robot Structural Analysis Professional software in analysis and design of the selected warehouse step by step. The instructional media was evaluated the effectiveness of the content by five experts. The revised instructional media according to the comments of the experts was tested by 34 students via pretest and posttest. The result was found that analysis for efficiency in production technical is in a very good level. Analysis for content performance is in a good level. Production technical satisfaction analysis is in a good level. The average score of content satisfaction analysis, test results, users, and media usage before studying was 8.176, and after studying was 14.294. The score after studying was statistically significant more than before studying at 0.05.

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