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Evaluation of the Tracker Tool on the Cessna 172s Throttle Using Simulation

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Abstract

The throttle is a device on the Cessna 172s training aircraft which is used to increase the amount of air used during combustion. To help overcome difficult throttle adjustments, special tools are needed in the form of a tracker. The existence of representative and useful tools to make things easier and save costs is really needed, therefore research to create work aids currently needs to be increased. Tool testing is also very important in knowing the maximum working point of the tracker tool which can determine properties such as shear elastic modulus, torsional yield strength and rupture modulus. The torsion test results consist of two parameters, namely the torsional moment parameter and the shear stress parameter. The tool that has been created in this research will analyze torsional strength using simulation.

Keywords: cessna 172s, Throtle, Simulasi

I. INTRODUCTION

One of the components on an airplane, especially a Cessna 172s, is the throttle. The throttle is a tool on the Cessna type 172s training aircraft which is used to increase the amount of air used during combustion. In the Cessna aircraft cabin there are 2 important parts, namely the throttle and mixture. To help overcome the difficulty of adjusting the throttle, a special tool in the form of a treker was created. The function of making a tracker tool in this research is to help Cessna aircraft technicians adjust a jammed throttle. This tool is useful for loosening and tightening components that are prone to sliding. The tracker can be used with a pull or push system depending on the type of tracker and also the type of work being done [1],[2]. Making the tools in this research requires testing. Tool testing is the most important stage in making a tool, because with testing we can find out the performance of the tool we make, whether it can operate according to its function and according to what is targeted, and from the results we can find out the advantages and disadvantages. Tool testing is also very important in knowing the maximum working point of the tracking tool which can determine properties such as shear elastic modulus, torsional yield strength and rupture modulus. This is related to aviation safety management. [3],[4]. The design of the Treker Aids for Throtle Stuck on the Cessna 172s aircraft will be tested using simulation to determine the torsional strength test on the Treker aids.

II. METHODS

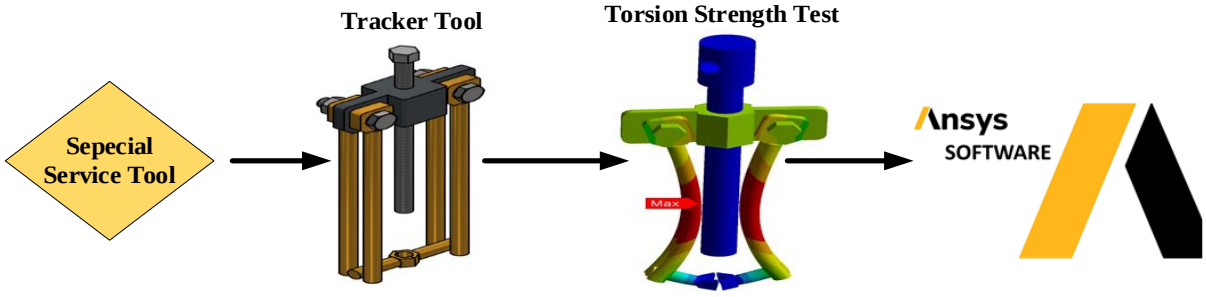

Figure 1. Framework of Thought

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Special service tools are very useful for technicians, especially in the automotive world. The special service tool created in this research is a tracker tool [5],[6],[7]. This tracker tool functions to make it easier for Cessna 172s aircraft technicians to overcome stuck throttle. The tracking tool in this research needs to be tested for strength to see the capacity of the tool [8],[9],[10]. In testing the tracker tool, torsion testing is required which will be simulated via Ansys software [11],[12]. The tool testing method used in this research uses a dummy and also uses an additional application in the form of ansys for a filing system which better shows the shape and appearance of the material under stress. Using a dummy from the tracker can determine the maximum torsional strength of the tracker. Testing the torsional strength of the tracker will be tried in the field using torque, then after testing the strength using torque, simulation testing will be carried out with Ansys software to strengthen the data analysis.

III. RESULTS AND DISCUSSION

A. Tool Design

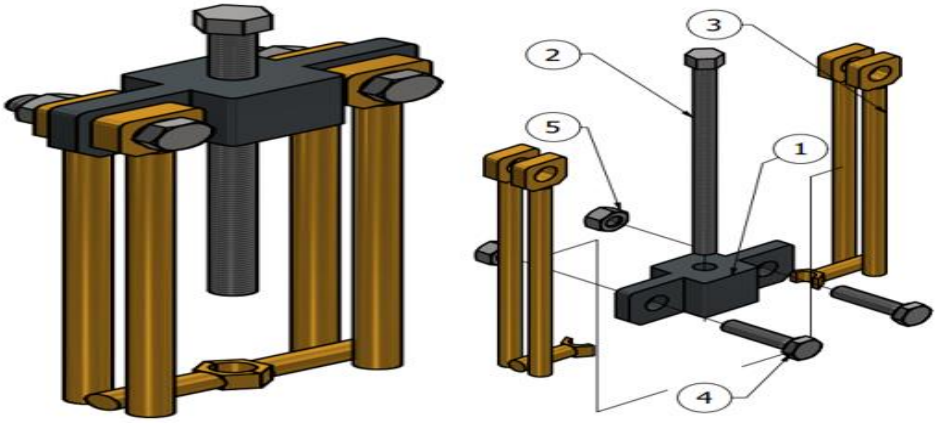

Figure 2. Tool Design

Table 1. Custom Material

Part List		
Item	Amount	Part Number
1	1	Custum Housing
2	1	AS Drat M6X100
3	2	Custom Pulls
4	2	Bolt M8X25
5	2	Nut M6

B. Component specifications

1. Solid iron

This iron is widely used in construction activities, not infrequently this iron is also used to make tools or universal keys. The solid iron used is diameter and square in shape. The solid iron used is cast iron. Cast iron is an iron-carbon alloy besides containing additional elements including silicon (Si), manganese (Mn), phosphorus (P) and sulfur (S). The microstructure of cast iron consists of ferrite or pearlite and free carbon flakes. The carbon and silicon levels in cast iron will influence the microstructure, while the size and shape of the free carbon and the state of the basic structure will change according to the quality and quantity. Besides, the thickness and cooling rate affect the microstructure [13].

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Figure 3. Solid iron

2. Thread the bolt

Bolt threads are a form that is very useful for life, for example they are used in nuts as a connection and transfer power in machines.

Figure 4. Thread the bolt

3. Supporting iron

A support bracket is a construction element used to provide support and stability to the structure of a puller tool. The support bracket used is made of steel material with a thickness of 5 mm.

Figure 5. Supporting iron

C. Test Results

The use of a dummy and also the use of an additional application in the form of ansys for the filing system which better shows the shape and appearance of the material that is exposed to stress, with a dummy from the tracker we can find out the maximum torsional strength on the tracker which is obtained at 50 in/lb with the throttle lever stuck, if you add strength becomes 55 there will be weakness in the hinge part of the tracker arm. This test was also obtained in the ANSYS simulation in the image below where the greatest torsional force occurs.

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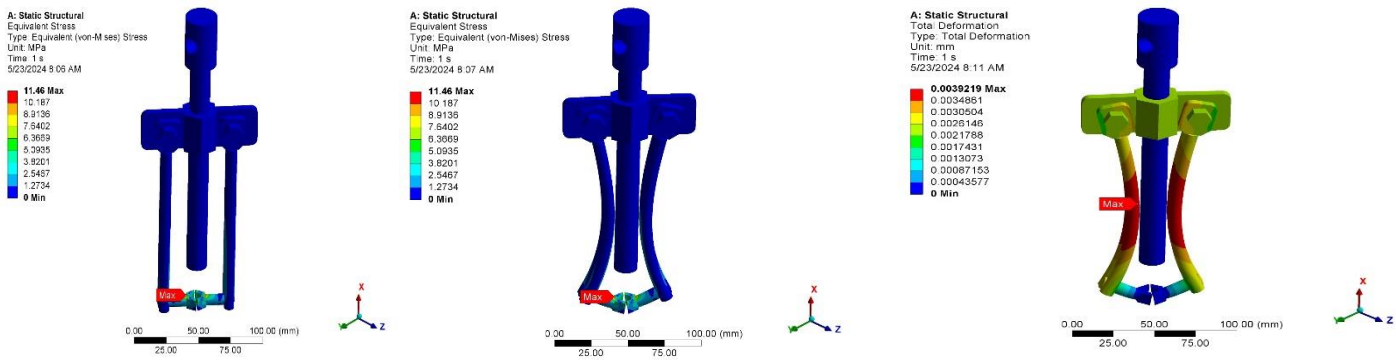

Figure 6. Tracker testing with ANSYS simulation

IV. CONCLUSIONS

The dummy of the tracker can determine the maximum torsional strength of the tracker by using an additional application in the form of ANSYS. Testing the TKER tool using the Ansys application can determine the reference capacity for using the tool on the Cessna 172S aircraft throttle.

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