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Development Rotating Bending Test For Learning Testing On Course Strength Of Material

Riski Elpari Siregar, Nizwardi Jalinus, Syahril

Abstract: This study aims to expand the fatigue strength test material for rotating loading material, with the modified the existing fatigue test equipment and can be used appropriately, so that students understand performing material testing procedures that will improve students' skills in testing. The development of test equipment is carried out by the method of literature study, and the design of tools through the calculation and drawing of project images. Then proceed with the manufacturing process, and then test the tools. The designed test equipment issued a variable time and number of rotations. The results of the study were obtained by the material fatigue strength test equipment, with the specifications of the test shaft rotational speed of 2850 rpm and the maximum load that can be given 100 kg.

Index Terms: Mechanics strength of material, testing instruments, fatigue strength.

1 INTRODUCTION

(Blessinger & John M Carfora, 2014) (Alaneme, 2011) in the research, the inquiry-based learning (IBL) model approach used in higher education improves the learning and teaching process and research involving multi-disciplines. So that student competencies increase, where in the era of globalization the increase in student competencies must continue to be done, for example by combining modern and classical learning methods (Alameddine & Ahwal, 2016) Using a modern learning model that tends to use ICT technology is very helpful in achieving student competence, although there is a lack of students not having empirical experience. To obtain an empirical experience student must carry out various activities in the learning process, starting from mastering the material to practicing. In practical learning, one of the suitable learning models is the inquiry model. This learning model guides students to find something from the results of planning the learning done. (Male, n.d.) stated in his research that there are 11 generic competencies that must be mastered by students in the eighth part is professional competence in which Mechanics competencies. (Hassouny, Kaddari, Elachqar, & Alami, 2014) Integration of Information and Communication Technology (ICT) in education is no longer a luxury education anymore, but the search for habits about the human learning environment with student experience is now a matter of consideration. Based on observations, more and more Physics lecturers use this technology to overcome the difficulties associated with the experimental method, in connection with that conducted experiments on the lessons of Mechanics using software in high school Physics students on experimental subjects on the topic of dynamics. The results of the study showed a promising thing: first, during the lesson the students' summative assessment rose significantly and secondly, they were more motivated in carrying out the tasks. Where in reality there is a difference between learning to use software with direct experience.

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Direct experience in mechanics can be done by testing with real workpieces and the right tools. This shows that there needs to be direct experience in the learning process as in related learning between one lesson and another such as Engineering Mechanics and Materials Science. (Randall, Moore, & Carvalho, 2012) the results of inquiry-based learning research suggest using the inquiry model because it can be predicted that it will be successfully applied in other lessons, because it can broaden students 'knowledge, because this process can expand students' pedagogical abilities themselves, where students learn to read books report and reflect on learning outcomes, and broaden their own topics. (Wang & Posey, 2011) in An Inquiry-Based Linear Algebra Class study on major engineering students, mathematics education and mathematics, where this study aims to overcome students' problems in mastering mathematics and after inquiry-based learning treatments are obtained in addition to helping students increasingly like mathematically, inquiry-based learning provides opportunities for students to prefer problem solving, specifically, students grow so that they can study mathematics independently, helping students to conduct research and solve journal problems more complicated independently without prior background knowledge. To answer the current developments, Mechanical Engineering Curriculum at The City College of New York suggested changes and suggested emphasizing the curriculum on a. incorporation of developing technologies such as MEMS / NEMS, nanotechnology, biotechnology, expert systems / electronics, advanced materials, assisted computer engineering (CAE) and non-traditional energy into the curriculum, and b. the introduction of new teaching strategies focused on student learning such as based on hands-on learning projects laboratory experience, inquiry based learning and home experiments (Marulcu & Barnett, 2015) (Delale, Liaw, Jiji, Voiculescu, & Yu, 2011) The development of science, technology and engineering requires TVET learning in the future to prioritize the techno-science-socio-cultural approach rather than the psychological approach. Education as a psychological process without the techno-science-socio-cultural processors will lose meaning. Children are psychologically intelligent but not socially, culturally, technologically, and scientifically intelligent will certainly not be successful in life in this XXI century. The characteristics of the new world of the XXI century are collaboration, collaboration, networking, and various resources. The psychological study of work must be complemented by a study of the sociology of work and work culture and then become a work ethic (Sudira,

2016). Science-based social systems of society have a research culture (inquiry), discovery (Kirscher, Sweller, & Clark, 2006) Paul in seeking answers and explanations of questions about the phenomena of the universe. The community conducts research both verification and externative research to produce evidence of existing theories and explanations of certain phenomena as new theories. Technology and engineering-based social systems of society prioritize design, discovery, creation, and engineering as a strategy in finding solutions to social, cultural, economic and employment problems. The synergy of the social system based on science and technology and engineering will make the society progressive and prosperous and capable of solving problems of life in a comprehensive manner. TVET's success can be measured by its level of achievement in building a culture of society that has productive inquiry, recovery, design, creation, and creative engineering capabilities in meeting life's needs. Modern work in the XXI Century requires collaborative problem-solving skills across disciplines or expertise, across fields, across spaces, and time. Team work and collaboration are demands for the completion of work, individual capacity is important but does not give meaning to individualists. Cooperation, effective communication, creativity, critical thinking skills, mastery of media and information technology, innovation is an important aspect in the development of TVET learning now and in the future. The development of capacities into capabilities is increasingly strengthened because the ability to work without well will mean nothing. Ability in the form of high work skills is needed in the completion of work tasks. In order to be effective and give meaning, work skills must be supported by adequate work willingness. Dewey advocated the modernization of the Vocational Education curriculum by including "scientific-technical". Dewey argued that traditional schooling had become blunt and mechanistic. As a progressive education, Vocational Education must make curriculum changes and learning that reflect real technological changes in the new century (Sudira, 2016) Mechanics is one of the most important sciences mastered by students because in Mechanical Engineering planning cannot be separated from this knowledge, for example in planning a construction, machine frame and engine components, mechanics is absolutely necessary in solving problems related to it, because if you make a machine construction, without proper calculation it can cause some things that are not desirable, such as construction is too large, this can result in some losses such as material that are too large which results in excessive manufacturing costs, if the calculation is wrong small than it should be, this can lead to accidents that can result in losses that can result in fatalities. Alaneme conducted a study with the aim of designing a fatigue testing machine for cantilever rotating bending, the planning principle used based on beam bending theory, after conducting a series of testing and machine observations obtained a potential testing machine and reliable data and tools that were cheap and easy to operate and inexpensive in terms of operation and maintenance. Santosh has developed rotating bending fatigue test equipment and the results are satisfactory. The cost of making fatigue test equipment is around Rs 7000. To find out the reability of the test equipment using the engine itself compared to the simulation results, the results are very small, in other words the fatigue test machine is considered good if used as a potential fatigue testing machine From the results of the study, the results of interviews and data indicate that the competence of educational students in mechanical engineering in the field of material testing needs to be improved, so that concrete steps need to be taken to improve it, from which the previous issues identified are: Necessary Material Tired Strength Testing Machine Type Cantilever Rotating Bending Load is able to improve student competence To improve this competency, it is necessary to validate the fatigue strength test of cantilever rotating bending load material which is connected with training and learning and how to develop learning devices when using tools in training using valid, practical and effective inquiry learning methods This research is important because the success of the research will produce Rotating bending tests and instruments that can be used for training in measuring and improving student competencies in the eyes of Materials Testing, Strength of Mechanics Materials, Machining Processes, Heat Moving, Materials Science Based on these researches, it will obtain fatigue strength test equipment for rotating bending type material

2. Development Procedure

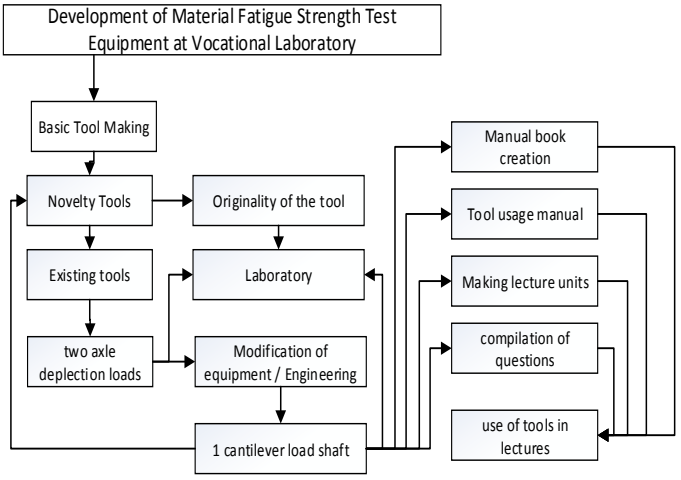

Figure 1 *Planning Development of Learning*

Materials Testing and Development Tools This research will be conducted at the material testing laboratory of the Department of Mechanical Engineering, Faculty of Engineering, Medan State University conducted in the 2017-2018 school year, with the aim of producing: 1. Cantilever load type rotating bending strength test equipment, and 2. student competency measurement instruments before after the separation of tools in the lecture.

3. Research Results

After a series of activities, the fatigue strength test of rotating bending cantilever loads was obtained as shown.

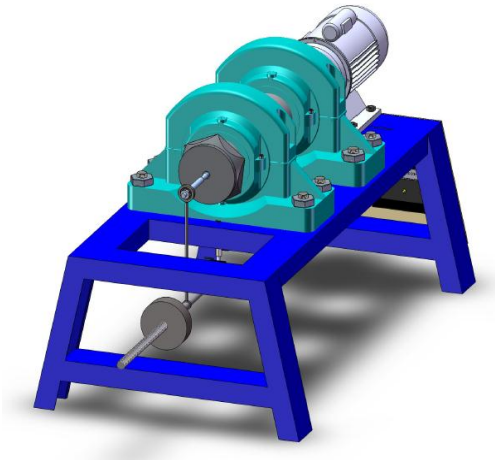

Figure 2 *Tool Perspective*

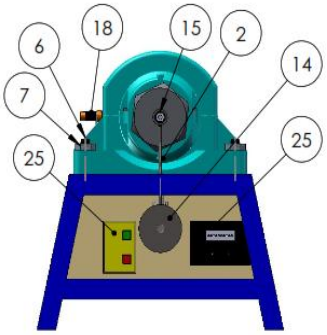

Figure 3 *Test Equipment Front View*

4. Conclusion

This test equipment has been successfully used well in materials training courses, and students have increased skills in testing materials with increasing ability to test the fatigue strength of materials, especially metals

REFERENCES

[1]. Alameddine, M. M., & Ahwal, H. W. (2016). Inquiry Based Teaching in Literature Classrooms. Procedia - Social and Behavioral Sciences, 232(April), 332–337. https://doi.org/10.1016/j.sbspro.2016.10.031

[2]. Alaneme, K. K. (2011). Design of a Cantilever-Type Rotating Bending Fatigue Testing Machine. Journal of Minerals & Materials Characterization & Engineering, Vol. 10(No.11), pp.1027-1039.

[3]. Blessinger, P., & John M Carfora. (2014). INQUIRY-BASED LEARNING FOR THE ARTS, HUMANITIES, AND SOCIAL SCIENCES: A CONCEPTUAL AND PRACTICAL RESOURCE FOR EDUCATORS. Emerald Group Publishing Limited (Vol. 91). Emerald Group Publishing Limited.

[4]. Delale, F., Liaw, B. M., Jiji, L. M., Voiculescu, I., & Yu, H. (2011). Infusion of emerging technologies and new teaching methods into the mechanical engineering curriculum at the City College of New York. Advances in Engineering Education, 2(4), 1–36. https://doi.org/10.1053/j.seminoncol.2014.08.006

[5]. Hassouny, E. H. El, Kaddari, F., Elachqar, A., & Alami, A. (2014). Teaching/Learning Mechanics in High School with the Help of Dynamic Software. Procedia - Social and Behavioral Sciences, 116, 4617–4621. https://doi.org/10.1016/j.sbspro.2014.01.995

[6]. Kirscher, P. A., Sweller, J., & Clark, R. E. (2006). Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching. EDUCATION PSYCHOLOGY, 4(2), 75–86. https://doi.org/10.1207/s15326985ep4102

[7]. Male, S. A. (n.d.). Generic Engineering Competencies Required by Engineers Graduating in Australia. In Developments in Engineering Education Standards (pp. 41–63). IGI Global. https://doi.org/10.4018/978-1-4666-0951-8.ch003

[8]. Marulcu, I., & Barnett, M. (2015). Impact of an engineering design-based curriculum compared to an inquiry-based curriculum on fifth graders' content learning of simple machines. Research in Science and Technological Education, 34(1), 85–104. https://doi.org/10.1080/02635143.2015.1077327

[9]. Randall, D. C., Moore, C., & Carvalho, I. S. (2012). INNOVATIVE PRACTICE PAPERS An international collaboration to promote inquiry-based learning in undergraduate engineering classrooms. Emerald, 29(4), 259–271. https://doi.org/10.1108/10650741211253859

[10]. Sudira, P. (2016). TVET ABAD XXI Filosofi, Teori, Konsep, dan Strategi Pembelajaran Vokasional. Yogyakarta: UNY Press.

[11]. Sugiyono, P. D. (2013). Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung: ALFABETA.

[12]. Thiagarajan, S. and O. (n.d.). Instructional development for Training Teachers of Exceptional Children& A sourcebook. ERIC.

[13]. Wang, H., & Posey, L. (2011). An Inquiry-Based Linear Algebra Class, 4, 489–494.