CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

As a conclusion, the simulation and analysis on the mini fatigue tensile machine was achieve and done to make it as simple machinery design. Cost is the main factor for industry or university to gain it for worker or students to generate it. The material of the design is available locally and the design is easy to fabricate on each part. In addition, this design also easy to maintenance on it or replace part when needed it. The main part that should be focus when maintenance is motor because it is the main function of the all part design. Motor rotates to make cyclic stress and fatigue on a specimen while operates. Specification of motor is important to choose in design because motor with lower torque is hard to pull the specimen with high yield strength. Furthermore, this machine only can pull the specimen with lower yield strength or stress than machine yield strength. Based on this, the specimen need to be made based on specification of machine type.

Based on analysis that had been made by using CATIA software, material of steel is good on durability by using finite element analysis. By using this software, the maximum value of stress will be identified on area that had been applied with force. The result show value of Von Misses is still lower than value of yield strength of steel and this means that the part of design will not fail. The maximum value of Von Misses for crank is 8.47e+006 N/m^2 and the improvement of the design also giving more advantage where the value of Von Misses had been reduces which is 3.86e_006 $N/m^2$and it will help on extend the

lifespan of part material. Steel give an advantage to made it or fabricate on it with lower cost. The purpose of designing this machine also effected on reduces cost to fabricate and maintenance on it. Furthermore, simulation that had been analyzed is done by CATIA software. Gripper move with horizontally by driven motor when analyze it without specimen test as on result. Speed of motor will be controlled to identify each angle of crank to pull the gripper without specimen. Based on this, force had been calculated with theoretically to know force that acting on each angle of crank when rotates without specimen. From graph, the result show bell curve had been form based on calculation.

Lastly, this machine will help about understanding of fatigue tensile. There is still several type of fatigue that will occur in life. The purpose of design this machine is able for student to use this machine and simple understanding about fatigue tensile occurs. It is hope the innovation of this design will be develop on the future.

5.2 Recommendations

As a recommendation, improvement of part should be develop and redesign to make long lifespan and good on durability. For example, change crank or pin as an improvement. Improvement of part only increase with 2mm of thickness to identify the strength of part. Torque or force that was taken will be affected while changing improvement of part. Improvement of part had been analyzed and show the maximum value of Von Misses had been decrease than value before. Steel will be used as a material of part design to make low cost than others.

Furthermore, specification motor also should be focus on choosing to use on design. Finding motor with more high torque is better to pull the hardness specimen. Typically motor with high torque is servo motor but it is high cost and most of it not rotates 360 degree with continuously compared to stepper motor. Besides that, specimens also need to

identify based on yield strength of material to test on machine because if yield strength of specimen high than machine, the specimen will be fail to make fatigue or pull.