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Submission date: 11-May-2021 08:27AM (UTC+0700)

Submission ID: 1583189611

File name: Udin3 lcofa1.pdf (514.71K)

Word count: 2132

Character count: 11657

RUBBER POWERED AIRCRAFT TOY BUSSINES IN SUCI VILLAGE OF PANTI DISTRICTS JEMBER REGENCY OF EAST JAVA PROVINCE

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Abstract

Community Partnership Program (Program Kemitraan Masyarakat/PKM) activity is for home industry of rubber powered airplane business located in Suci Village Panti Sub-district Jember East Java Province. The first partner problems was used traditional tools, its takes along time and wasteful energy to make process production one units of rubber powered airplane. This is certainly not effective and efficient. Besides, the business management is still very simple and its marketing although it has reached the area around Jember, Jogja and Kalimantan, but still not yet evenly distributed. The second problems partner that faced was marketing facilities such as stacking racks, storefronts and unavailability of online sales. The Partnership Program of the Community intends to provide solutions in the form of material assistance, production equipment rental and marketing support, business management training and marketing strategy through social media, in order to increase production capacity, managerial ability and partner marketing. The results of this activity will have a positive impact on partners because it can increase the effectiveness and efficiency of the production process so as to be able to increase production capacity in per day from 20 units to 200 units of rubber-powered airplane. Thus, it can meet the time target of orders desired by consumers through a purchase agreement. The benefits of providing training of business management and marketing strategy for the partners will be able to understand how to analyze the profitability and efficiency of the business and to expand the marketing network. Furthermore the partners can also improve the quality of products according to consumers needs.

Keywords — Rubber powered airplane, styrofoam, balsa woods

1. INTRODUCTION

Since starting the rubber airplane toy business in 2013, Mr. Moch. Oni Suryanto underwent several changes to develop his business in accordance with the demands of the model, raw materials and economic principles [1]. Models of rubber-powered toy aircraft produced include types of single and double wings, eagle, bamboo airplane, jet models, and commercial models [2]. All aircraft have propellers mounted on the fuselage. For propulsion, a special rubber is attached which is connected directly to the length between the base of the body to the hook on the plane propeller. By referring to the driving force which is only a rubber (special rubber), then the plane is also designed as a plane model. The technical calculation of toy airplane modeling still uses aerodynamic rules. The function of rubber bands in this model aircraft is as a driving machine. Rubber bands that are rotated several times will produce spring power. Furthermore, this spring power acts as a motor to drive the aircraft's propellers. Rubber powered aircraft drives and knowledge of torque motors for aircraft models have evolved in stunning ways like oil engines and jet engines on real aircraft.

The average production cost to make one of the simplest types of aircraft is Rp. 7,000.00, while the selling price is Rp. 15,000.00. Average production per day is 40 units. So that the gross profit of his business is Rp. 8,000.00. If reduced by inventory, maintenance, packing and marketing costs, the net profit is Rp. 5,000.00 for each unit. Thus, Mr. Oni's income is Rp. 200,000.00 every day. For the sale of special toy aircraft for the Super Hero type, the net profit is Rp. 25,000.00 per unit.

The range of ordering these creative products in a number of major cities such as Semarang, Solo, Jepara, Bogor, Yogyakarta, Trenggalek, Surabaya, Madura, Bondowoso, Probolinggo, Malang, Kalimantan and Jakarta even abroad. This is a business opportunity that leads to promising profits. Some products have also begun to be developed so that the market is not depressed [4]. There are various kinds of product variants that have been produced by this business such as, double-frame fighter jets, double wings, replicas and Super Hero cork scala starting from Rp. 15,000.00 to Rp. 150,000.00.

Every business certainly has its own problems, as well as this rubber powered aircraft toy business. The main priority is the problem of production, business management and expansion of the marketing area [3]. The production equipment owned is still very simple. To cut balsa wood and Styrofoam its using ordinary cutters and scissors. As for smoothing the frame still using sandpaper that is done by hand directly. This results in the amount of time and energy consumed only to make one plane. The time needed to make one aircraft toy unit is approximately 45 minutes. Besides that, the time needed for the coloring process or painting on the fuselage also hampers production time because it still uses cotton or brush.



Figure 1. Partner and His Products



2. Painting of Aircraft Parts

In Figure 2, its manual for the painting process by placing paint on the brush and then painting according to the design pattern. In this process the first step is to mixing the paint to get a uniform emulsion. Next, prepare styrofoam that has been patterned according to the design by placing it on a flat surface. Then do the painting process using a brush or cotton on the styrofoam. To produce even results in this painting process, it is repeated 2 - 3 a time.



Figure 3. Material for making toy aircraft.

In Figure 3 the raw materials for manufacturing rubber-powered toy airplanes consist of balsa wood, rubber, paint, styrofoam, thread and adhesive glue. Generally, the manufacturing process requires understanding skills and knowledge about the characters from the actual aircraft. Tenacity and accuracy in making toy aircraft must also be considered because it will affect the precision of the aircraft produced.



Figure 4. Hand Tools

In figure 4, using hand tools to making the toy aircraft like cutter, scissors, pliers and electric drill with a 2 mm diameter. So it requires skills in using the equipment. The first step to cutting balsa wood and styrofoam is by placing on a flat surface, then providing measurements according to the pattern

with the design then cutting the material using a cutter. Using scissors to trimming out for styrofoam. To make aircraft propellers also done manually by cutting mica plastic according to size and pattern using scissors.

After cutting balsa wood into frames, painting process of the wings and making aircraft propellers like on figure 5 and 6. Next a flight experiment was carried out by taking samples of aircraft toy (figure 7) that had been assembled to be seen and examined for flying ability of the aircraft. Only standard flight tests carried out with the aircraft reference can fly straight ahead and can do a gentle landing or not swoop.

The material needed to assemble consists of a rubber strap as a power source, a propeller hook, a rubber band to clamp the wing and aircraft frame and a hose propeller. It's manual to performed assembly process. Sequentially, the installation of rubber hooks to the fuselage, installation of the header hose blades, then the tail mounting, rear wing, front wing and lastly the installation of rubber strap as driving force of toy aircraft.

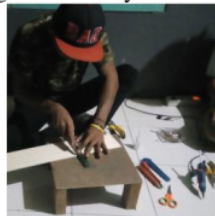


Figure 5 Cutting process of balsa wood using a cutter



Figure 6 Wings Making with cutting of Styrofoam



Figure 7 assembly process

From the description above and the condition of consumer demand that exceeds the production capacity and the limitations of production equipment, it requires steps to meet and accelerate the production process by adding and making appropriate technology. The purpose of this activity is to provide solutions for problems faced by partners in the form of :

1. Giving material assistance and rental of production equipment.
2. Provide appropriate technology tools.
3. Provide training on safety tools and the operation of appropriate tools with procedure.

The benefits of this service program are :

1. Increase the production capacity of partners.
2. Increase the use of safety tools.
3. Reduce the waiting time of production.

2. METHODS

The used method in this program was observation and interviews directly with partners :

1. Observing the production process of rubber-powered toy aircraft conducted by partners.
2. Observing the quality of the toy aircraft produced.
3. Observing the production equipment used.
4. Observing the business management that is run.
5. Observing product marketing conditions.

In general, the stages of implementing for programs may include:

1. Preparation.
2. Literature review.
3. Field survey.
4. Preliminary data collection and processing.
5. Preparation of material needs, production equipment and training.
6. Provision of materials and production equipment.
7. Business management training, marketing strategies, sales website creation and product quality improvement.
8. Monitoring and evaluation.

3. RESULTS

The results achieved for this programs (PKM) are :

1. Survey and Observation activities conducted produce :

Mapping of technical problems faced of by partners, like usage of simple tools production and non-technical urgency of management and organization of Jember Aerospace (UKM Dirgantara Jember). Furthermore establish of PKM programs team. The team consists of 13 person with 3 lecturers, 2 students and 8 partner employees.



Figure 8. Team of PKM 2018

This problem solving is formulated including:

1. Purchasing raw materials for styrofoam, balsa wood, rubber, cork paint materials etc.



Figure 9. Purchasing styrofoam Figure



10. Making of Balsa wood cutter

2. Making balsa wood cutting tools and styrofoam cutters.
3. Purchasing screen printing unit (sablon).

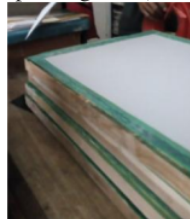


Figure 11. Purchasing screen printing unit Figure



12. Setting of production areas

4. Handling and setting of production working areas.

Handling of consumable materials needed with the plan to spend the funds that have been received, such as styrofoam shopping, balsa wood, rubber, screen printing printing tools, making printing screen printing

designs. CV. Gita Karya Suci – Panti workshop make tools of balsa wood cutter also hot wire styrofoam cutter. The process of delivering materials such as balsa wood, rubber (fai rubber), and production equipment (printing screen printing, balsa wood cutting, styrofoam cutting, stacking racks) to partners. With this effective tool, the production capacity to make rubber-powered toy planes is 200 units per day from only 20 units per day.

5. Operation of tools production training.

The result of this training is how to operate balsa wood cutting tools and styrofoam cutters in accordance with the procedure.



Figure 13. Operation of hot wire styrofoam cutter Figure 14. Rubber Powered Aeroplane Product

Outcomes have been achieved by the Community Services Program activities are as follows:

1. Publication of Community Partnership Program (PKM) activities in Radar Jember, Jawa Pos, 29 June 2018 edition. <https://radarjember.id/2018/06/29/onie-suryanto-pembuat-pesawat-mainan-white-eagle-terbaik/> or <https://radarjember.jawapos.com/read/2018/07/01/84476/tolak-pesanan-india-karena-tak-mampu-produksi-masal>
2. Appropriate technology such as Balsa wood cutter and styrofoam hot wire cutters.
3. Video of Community Partnership Program (PKM) activities at Dirgantara Jember in Suci village, Panti District, Jember Regency.

4. CONCLUSIONS

1. The process of making toy rubber power aircraft of Dirgantara Jember UKM made from styrofoam and balsa wood by using hand tools manually to cut the raw material. As for coloring on aircraft parts, it is done with brush and cotton. With Community Partnership Program (PKM) could provide appropriate technology such as balsa wood cutter and styrofoam hot wire cutter, so the production capacity can be increased from 20 aircraft to 200 aircraft toys per day.
2. The process of making rubber powered airplane toys includes :
 1. Cutting Styrofoam was in accordance with the thickness of the aircraft parts (hot wire cutting tools).
 2. Packing aircraft parts such as the wing, body and tail of the aircraft.
 3. Cutting balsa wood as a plane frame (balsa wood cutting tool).
 4. Manufacture of propellers or aircraft propellers.
 5. Assembling all components of the toy aircraft equipped with rubber installation.
 6. Test of flying the rubber power aircraft toy.

ACKNOWLEDGEMENTS

With the completion of this service program, we express our gratitude to the grant for 2018 by Directorate of Research and Community Service, Directorate General of Research , Technology Development and Strengthening the Ministry of Research, Technology and Higher Education

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