

Paper 3b

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Traditional Industries and Creativity in *Mie Lethek* Production Process Technology

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Abstract—Traditional industry is an industry that empowering people resources that are still by traditional technologies in their production processes. Ways of processing and equipment that is maintained traditional production of the industry is an obstacle to the fulfillment of production targets, but culturally, processing, use of the traditional technology in industrial equipment and production processes is a unique creativity. Dusun Bendo, Desa Trimurti, once a production center for flour noodles with cassava flour (*tapioka*) as raw materials. Desa Trimurti was right on the edge of the Progo river, included in the district of Srandakan, Kab. Bantul, Jogjakarta. There is one of noodle industry called *Mie Lethek* is the property of Yasir Ferry Ismatrada grandson of Alm. Bisyi Umar Nasir who was the pioneer in the making of *tapioka* noodles, in the 40s. *Mie Lethek* production process is done by human labor and assisted by two cattle. This paper examines how an industry is a manifestation of creativity to create applied within the framework of the preservation of traditional culture. Traditional technologies are morphologically examined the entire production work equipment. Morphological technology equipment assessed as morphological forms and analogies mechanisms as a creative process solve problems in the industrial production process of *Mie Lethek*. From these studies it is expected that the value of creative applied to technology can be conserved as historical value traditional technology. Besides the traditional production process is learning the cultural historical value tech community. The aim of this paper is to make an example of the tool and evaluate the morphological analogy, the output map the morphology and function of analogy overview

Keywords—*Mie Lethek Production process, Morphology, Analogy, Creativity*

I. BACKGROUND

The design requires appropriate methods to facilitate understanding of the problem and provide the best solutions and innovative. The case studies were used to assess the application of morphological analysis method with a combination of analogy method in this case is the process of designing tools to make “*lethek*” Noodle as traditional industries that still use the ability of human thinking skills intuitive. The technique which makes this study interesting and important is how humans get engineering solutions to find or develop a mechanical logic that might have existed since centuries ago, but with the development and knowledge of new materials and technologies, so that the tool can be developed mechanical means.

Mie Lethek gets its name from the noodle's muddy color. Instead of the usual flour used in Chinese-style noodles, the basic ingredients for *Mie Lethek* comes from a mixture of *tapioka* flour and *gaplek* or the sliced dried

cassava roots with no preservatives used.

Morphology means the study of the form (shape / form). Morphological analysis is a systematic effort to analyze the product forms. The map of morphology (morphological chart) is a summary of the analysis. In the future map of morphology (morphological Chart) can help the engineering designer to identify new combinations of elements or components of the products of this map can compile complete elements, components, or sub solutions that can be combined to obtain a solution. The solution obtained of the possible combinations can be done is a solution that has been existing, or new variations.

Analogy method is to use reasoning phenomenon. Analogy in general is one of the techniques in the process of inductive reasoning. So the analogy is sometimes also referred to as inductive analogy that the process of reasoning from one phenomenon to the other similar phenomena later concluded that what happened to the first phenomenon will occur also in other phenomena. Type analogy distinguished from how to use the phenomena and relationships.

II. LETHEK NOODLES PRODUCTION PROCESS OBSERVATION

Dusun Bendo, village Trimurti, once a production center of flour noodles with raw materials called *tapioka*. Trimurti village were right on the edge of the Progo River, Srandakan, Kabupaten Bantul. The village direction is approximately 15 km south of the city of Yogyakarta. Business owners of *Lethek* noodles is Yasir Ferry Ismatrada.

Since its establishment until now nothing has changed in terms of both equipment and optional use of its workforce. Initially in place is not using the machinery; the whole production process is done by human power aided by cattle. Cattle which used is a kind of *Brahma*, who has great posture and has a more powerful. Cattle can do heavy lifting than a horse or buffalo. In the other side, cattle operation is easier, because the speed is adjustable and can be stopped suddenly. Energy produced from cattle is very large, with a low but consistent pace. In production room of a cow would move slowly around the table / circular cement tanks as high as 50 cm and a diameter of 3 meters. Along with the movement of cattle, cylindrical stone weighing 1 ton on the table cement connected to cattle's neck rotates grind noodle dough. Cattle used in the process of grinding and mixing dough cassava flour and *tapioka* flour, before steaming phase and the first batter after batter mixing of the first dough steamed. The milling process was done 2 times, with an interval of 2 hours rest. Cattle also have to run around, and occasionally pausing

items 10 to 20 seconds to allow the workers to stir or flip through the dough. In one round of cattle stopped 2-3 times.

Noodle production house owned by Mr. Ferry has three cows. Noodle production takes 2 working days and one day off to allow the cows to rest. The cows are used in turns every milled. In one day, the production activities carried out three times: 08:00, 15:30 hours and 20:00 hours.

In one stage of production (day 3 times milled) takes 650 kg of dough to produce 600 kg of dried noodles. Although wearing traditional equipment, production capacity can reach 10 tons per month. To get 10 tons of noodles, Yasir requires about 10.5 tons of tapioca flour and 20 tons of dried cassava. Lethak noodle production is still not sufficient market demand is increasing, while the increase in the production process still limited. Production average per day was 1.15 tons per day but he said figures were not yet able to meet the market demand, which reached 3-5 tons per day.

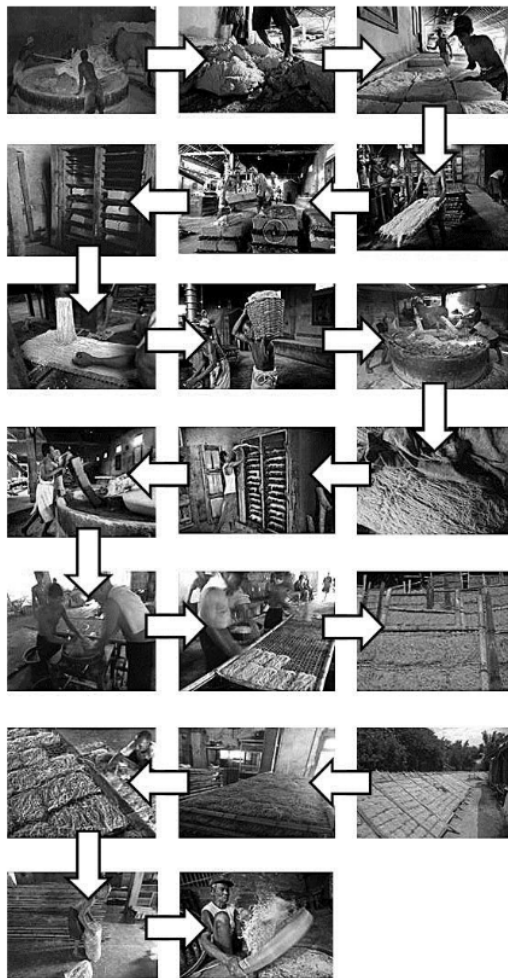


Fig. 1. The stages of the production process.

In the production process there are several steps that must be passed. The first stage is milling starting materials

namely cassava in order to obtain granules desired, the second stage was soaking cassava flour, the third stage is the mixing result of grinding with tapioca flour, the fourth stage is compacting and molding the shape of the box/ block size of 30x40 cm, the fifth stage is steaming mixing flour that has been shaped block, the sixth stage is the process of grinding and the addition of starch to obtain a dough composition is desired, the seventh stage is pressing noodles dough, eighth stage is steaming noodle, ninth stage is a cooling of the noodle, the stage of the tenth is a process soaking the noodles can be parsed or separate easily, the eleventh stage is measure the noodle volume, the twelfth stage is drying, the thirteenth stage is packing.

Overall, it takes 5 days production from the first phase until milling cassava into noodles and ready to sell. Due to the process of soaking the flour should be for 2 nights with replacement of water each day. While mixing the flour with cow power could shift lasts 12 hours with alternating cow. The process is continued in the evening if the milling process with cattle not finished. Steaming process of flour block also requires a long time is about 4 hours. After being unloaded from the steamer, is to cooling the flour block. Furthermore milled back until the dough has a certain elasticity. Furthermore, desired dough is placed in presses to make noodle strands. Noodles produced poured in sheets of woven bamboo, then steamed back for 3 hours. After being unloaded from the steamer the noodles place in covered plastic and stay overnight in a closed condition tarp. The next day soaked in water and then measured out and arranged in sheets of woven bamboo basket hollow. The woven bamboo sheets are dried under the sun. The Difficulty is to drying the noodles if overcast conditions drying can last more than 2 days. Drying oven rated not produce noodles as expected. Thus this process depend solar heat, hot air, and the moving wind had dried noodles. The next step is packing the noodles into a plastic bag (Fig.1).

III. CREATIVITY DRIVEN IN DESIGNING MACHINE SUBSTITUTION

The use of modified catapult meant to get tremendous pressure on the stalk end. At the end of the shaft has been placed sacks of dough and noodles display devices, so that the dough will be pressed to produce strands of noodles. The force principle of gravity is generate large pressure to suppress around more than 1 ton of dough. But with the changing times, the owners want a constriction device that is more effective and efficient. Then catapult that requires five labor as the operator is inefficient. With the method of trial and error, the owner tried to make a hydraulic press. The owner taught himself about the functions and ways of working hydraulics. With creativity then make noodles with a hydraulic pressing machine using liquid oil.

Creatively indeed the owner tried to solve the problem because there is an urgent need for a tool presses. The working principle is applied is the printing of the noodles through the hole in the filter with high pressure. Functionally the appliance is functioning, but there are things that still need to be revised, even though the use of oil. Oil is not safe to use as a hydraulic fluid for the food, because of the risk when there is a leak. The use of the tool material with iron materials are not food grade also dangerous. Below is a catapult replacement tool for pressing the noodle dough (Fig.2). Mechanism of catapult used to pressing the noodle dough. To operate this "machine" needs five persons. Now they replaced the

catapult to the hydraulic pump to pressing the dough (Fig.3).



Fig. 2. A giant catapult mechanism.

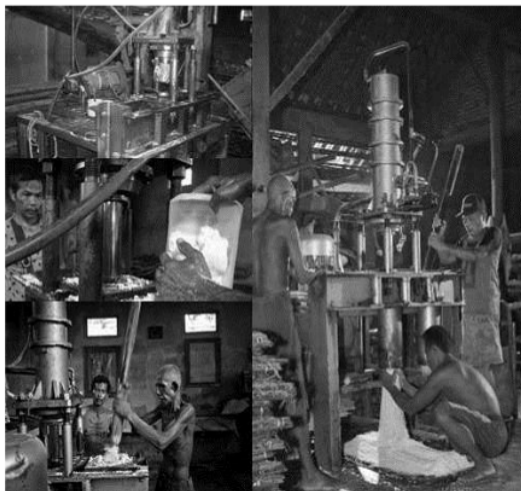


Fig. 3. Oil hydraulics pump.

IV. MORPHOLOGY ANALOGY

Morphology is a method of studying changes in shape, but in the context of designing morphology, it is a creative method to generate ideas. By dividing part tool in the form of the structure, type of component, part or function of the form element tool will easily get substitute alternative design tools with the choices made. Morphology will help to generate alternative ideas in developing design alternatives.

While the use of analogy is to make it easy to imagine the design tool that changed or redesigned. Analogy is the perception of object methods, form or function of the tool is considered to have similar or type, mechanism or similar functions.






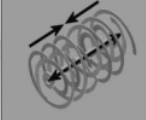
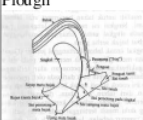


Function	Analogy 1	Analogy 2	Analogy 3
Grinder, Presser,	Steam Roller 	Stomper 	Sugar Cane grinder 
	This truck serves full view base density of the road so that the foundation stone with another stone and bind more tightly to one another. The mechanism of forward and backward motion, one axis	Stomper serves to compact the soil surface or base of the foundation, because of the smaller easily directed movement up and down	This tool serves to flatten cane to extract sugarcane juice. The way it works is some sugar cane rods inserted later two rollers will move in opposite direction to flatten out
Mixer	Vertical Concrete mixer 	Horizontal concrete mixer 	Auger screw 
Dough Flapped	Plough 		

Fig. 4. The morphology and analogy study

In this case study, tool in the morphology and the analogy is a dough mixer, dough grinders, mixers and presses the noodle dough. Lethek noodle-making process, a tool used to pressed, mix the dough. But in the process of mixing, the dough flipped process is manually done by the operator. In analogy, grinder / compactor analogous to the way foundation compactor, soil compactor, and sugar cane presses. Analogy mixer using Molen, concrete mixers and mixer dough for bread. Inverting tool analogous to plowshares, which has the function turn the soil on the farm. The design concept is built on the analogy morphology alternatives and then analyzed and selected the best alternative concepts. The alternative choice is then compiled with machine component or device with morphology to alternative design concept. The idea of the design can be arranged to be more varied but still in the realm of thought to design solutions to problems that have been encountered before.

V. ANALOGY FOR MORPHOLOGY




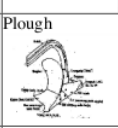




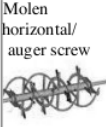



Mixing, grinding, pressing machine design	Analogy morphology		
	A	B	C
Pressed mechanism	Steam Roller 	Sugar Cane Grinder 	Stamper 
Flapped mechanism	Plough 	Plough 	
Mixing mechanism	Molen vertical 	Molen horizontal 	Molen horizontal/ auger screw 
Unloading dough			

Fig. 5. Analogy morphology alternatives of the machine component.


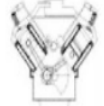




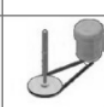
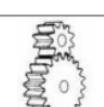
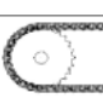
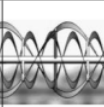

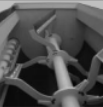

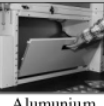

No	Variable	Variant		
		A	B	C
1	actuator	 AC Electric Motor	 Piston Motor	 Manual
2	Machine structure	 L Profil	 U Profile	 I Profile
3	Transmission system	 V-belt pulley	 Gear	 Gear and chain
4	Mixing tools			
5	Unloading			
6	material	Textured metal sheet	Aluminium sheet	stainless steel sheet

Fig. 6. Final selected design concept.

VI. EXAMPLE MORPHOLOGY FOR MACHINE LOOKING FOR IDEAS COMPONENTS

The concept of design alternatives been returned

through the analysis of the criteria for performance specifications are planned. In the finally selected a design concept that is then etched, developed and make it in detail with working drawings mature plan. To be able to analyze about a possible malfunction of the tool properly requires experience and knowledge. Methods of making a model to test the concept suggested before the prototype tool is made as real as possible. Prototype trials will help to ensure the tools work according to specifications expected performance.

VII. CONCLUSION

Morphology in this example is still possible to be developed further so that it can be composed of its morphological chart. Parts of the morphology which thought as analogy function is to find an alternative or replacement parts tool aimed at. Preparation of maps morphology and try to analogize how the tool works requires logic mechanisms, extensive knowledge and creativity to connect. Mechanisms logic skills and knowledge of the tools that has a function or work like is important. With the expected morphology chart designer has many logical alternative to design and develop tools.

The table above shows that the process of creation of means of production on the home's noodle industry letek replicate and modify existing tools. Creativity designing production tools traced from an understanding of the logic of the mechanisms existing tools are then applied to the working methods in the production process. Of course in the development and technological progress is actually a lot of things and a lot of tools that can be replaced, changed and modified or replace the system processes and work tools into a modern industry, guaranteed by quantity and quality and hygiene. But in fact many things that need to be appreciated are how the owner has the mission to employ as many people and maintain a traditional way and is unique in the manufacturing process. Replacement tool does do the part that had been considered ineffective and inefficient, i.e. for replacing traditional presses with hydraulic presses.

Creativity is not only how to troubleshoot problems with the best solutions, but also able to pick the best. The selection process is packing production in the traditional way which preserved to attract tourists. The production process now only conserve power tool grinding work remains interesting and unique cow that became an icon of culinary tourism in Yogyakarta. Finally this industry sustainability depends on the future course whether his successor will continue to sustainably or lost in modernization and economic interests.

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