



The Process Of Making The Angguk Pump Diorama

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Abstract. Suckers rod pumps in the oil and gas industry are tools used to take petroleum from wells to the ground surfaces. The pump method is used for wells that do not have sufficient pressure to raise oil to the surface. This paper discusses how to make a pump nodding diorama using aluminum as the main material, a working drawing is also needed make the process easier when working on the machine. The machines used for the diorama manufacturing process are milling machines, acrylic laser cutting machines and CNC milling machines. US for other components that help the process of moving this diorama, such as a torque spec motor so that the walking beam assembly can go up and down like the original bobbing pump, because if you use a motor with a speed spec, the load will not be lifted. this research was conducted to explain the working drawings of the pump nodding dioramas, explain the manufacturing process and explain the components of the pump nodding dioramas.

Keywords: Suckers Rod Pump, Diorama, Machining, Turning, CNC Milling, Milling

1. Introduction

Crude oil is currently the main sector to support national energy security, so that activities Exploration and exploitation of petroleum is still being carried out. The oil exploitation activity itself is still being carried out with effective And efficient For look after or increase production [1]. Ability produce something wellis reject measure deep planning pump nod [2]

In the oil and gas industry a boll pump is a device used to extract petroleum from well to ground level. The pump method is used for wells that do not have enough pressure toincrease the oil or the flow of oil over the surface [3]. Then a diorama or what is better known is made with a miniature so that you can get to know the parts of the bobbing pump used to suck up petroleum from the well to the ground level, the bobbing pump uses a method to convert rotary motion into movement vertical.

The most important part of how an oscillating pump works is understanding the up and down forces. In the *upstroke phase*, the sucker rod moves up (*up stroke*), at *this time the traveling valve* moves away from *the standing valve*, because of this pressure from fluid on, *traveling valve* close And fluid can lifted And through it pipe. When stemmoving up, the pressure in the barrel drops to the vacuum pressure, which makes the formation pressure open vertical valve and fluid enters the barrel. The purpose of this study is to explain the working drawings of the manufacture dioramas pump nod,

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M. U. H. Al Rasyid and M. R. Mufid (eds.), *Proceedings of the International Conference on Applied Science and Technology on Engineering Science 2023 (ICAST-ES 2023)*, Advances in Engineering Research 230, https://doi.org/10.2991/978-94-6463-364-1_27

explain process making And explain component on dioramas pump nod.

2. Methodology Study

In this process there are several steps that are carried out to form a diorama of the pump nodding, as follows a number of stages from making dioramas bobbing pump :

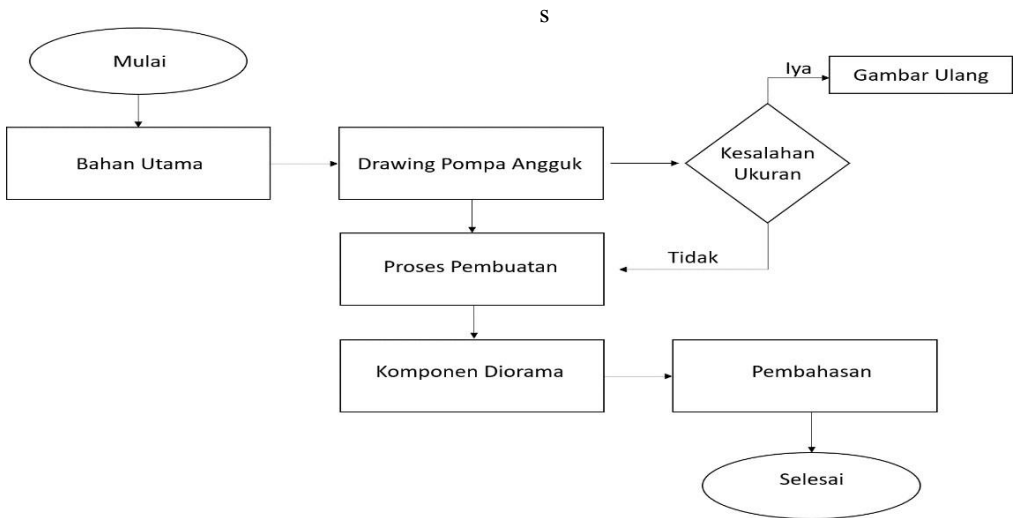


Fig. 1. Diagram Channel Study

2.1 Material Main

Materials or materials used to make the pump nodding diorama are Aluminum Alloys 6061, as for *the base* or place for the pumping nodding diorama which is made of wood. To create a group name, Name agency And company name using material acrylic.

2.2 Drawing Pump Nod

Working drawings or *drawings* are the most important thing when making dioramas. Drawing process dioramas pump nod use *software* inventors And For do the simulation use *software* solidworks.

2.3 Process Making

After the drawing process, the next step is to make parts or parts of the pump diorama nod. The machines used are lathes, milling machines, *CNC milling machines* and *laser cutting machines Acrylic*.

2.4 Component Dioramas

Component Also including Wrong One part from process making dioramas, without exists component like dynamo,pulleys, cables, *on/off switches* and adapters, so this diorama will not be able to move like a bobbing pump original.

2.5 Discussion

In this section of the discussion will explain the results of making working drawings, how to use the machine, the results of the machining process and an explanation of what components are used in making the dioramapump nod This.

3. Discussion

3.1 Drawing Dioramas Pump Nod

this *drawing* process, Inventor *software is used* to create 3D and 2D, while for make a simulation using Solidworks *software* . For *drawing* follow the picture given by company and redraw to change the scale to make it smaller than the original picture so that the goods are made not too big. Following a number of *drawings* Which represent pump nod :

1. Walking Beam Assy

Walking beam assy is stalk horizontally Which have size long 321 mm, with thick 13 mm long and 41 mm wide. Its function is to continue the up and down motion generated by *counter weight* and *equalizer pitman assy* . The material used is aluminum and machine process which is conducted use CNC machine Milling.

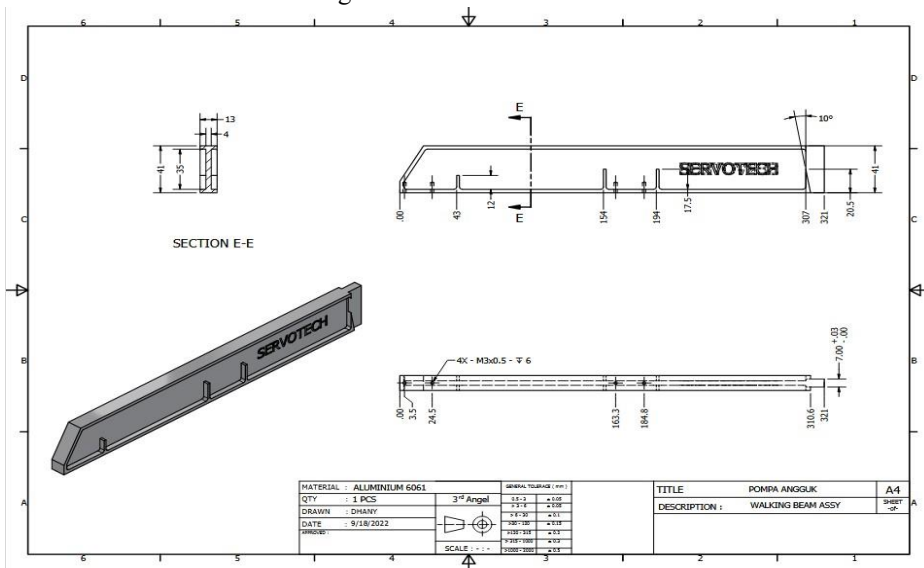


Fig. 2. Walking Beam Assy

3. crank Pin Bearings

Pair stalk Which installed on *Equalizer Pitman* and *Counters Weight* For help process go on *And descent walking beam* . Part This difficult If use machine *Frais*, so made with using a *CNC Milling machine* to make it easier in the process. For materials that used is aluminum.

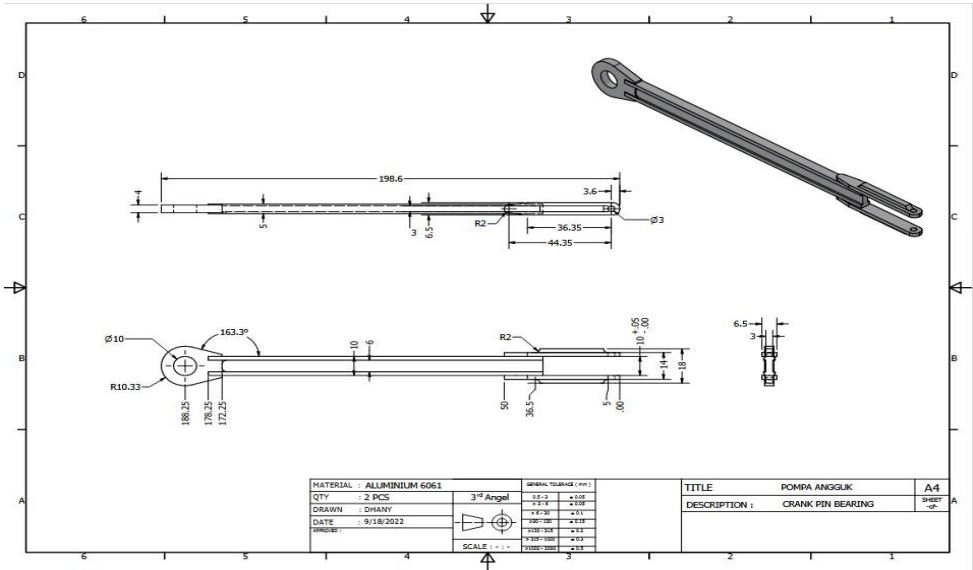


Fig. 4. Cranks Pin Bearings

4. Equalizer pitman

The *pitman equalizer* is a part that moves freely according to operational needs as well become liaison between *crank pin* And *walking beam*. Part This have long 123.35 mm with height 24.9 mm and a width of 10 mm. material that used made of aluminum And that machine used is machine *CNC milling* .

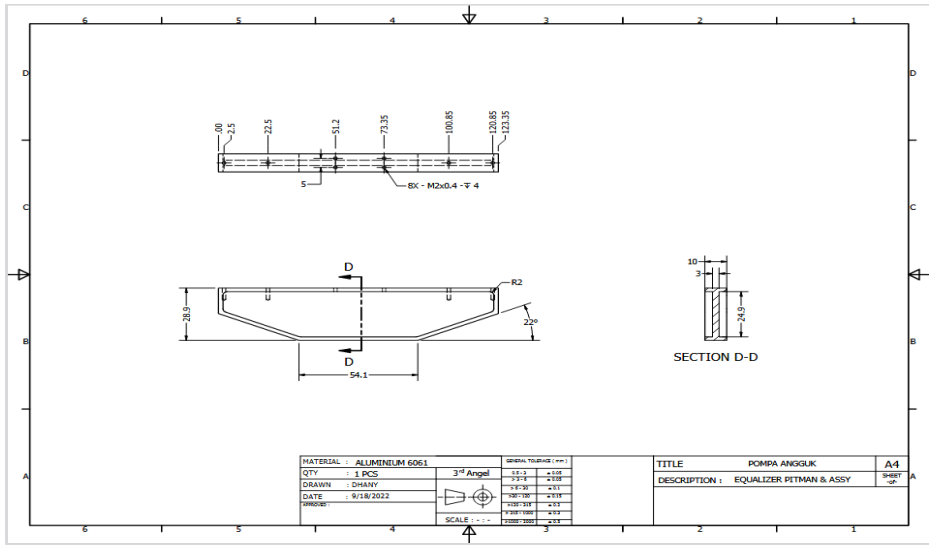


Fig. 5. Equalizer pitman Assy

5. Counters Weight

Counters weight is pair tool ballast Which function For give balance on pumping units. Have long 64.5 mm, tall 60mm and wide 7 mm. Process machine Which doneie use CNC machine Milling

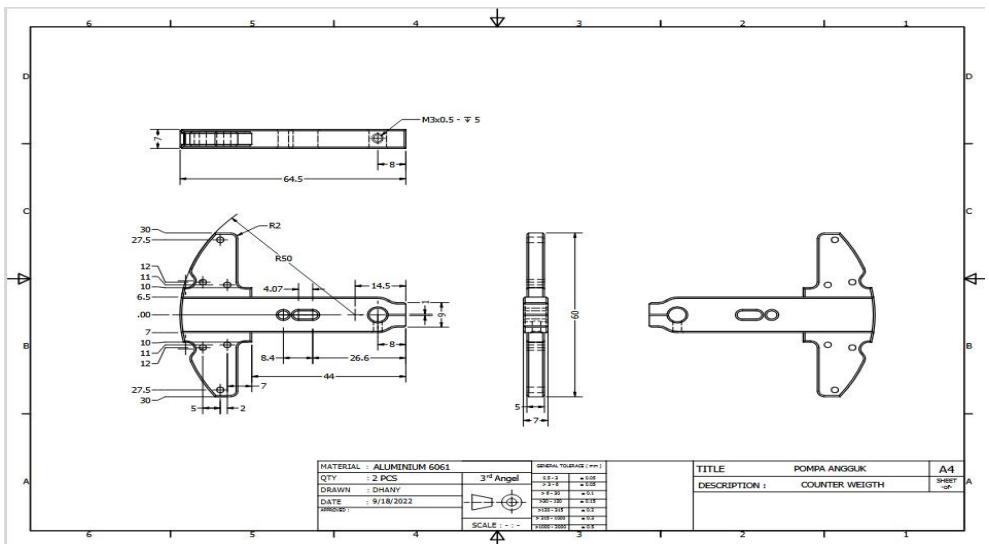


Fig. 6. Counters Weight

6. Horse heads

Serves to reduce the motion of the walking beam to the pump unit in the well, this is head from walking beam Which resemble head horse. Making object This Enough complicated If use machine Frais, so used machine CNC Milling so that process manufacture easy.

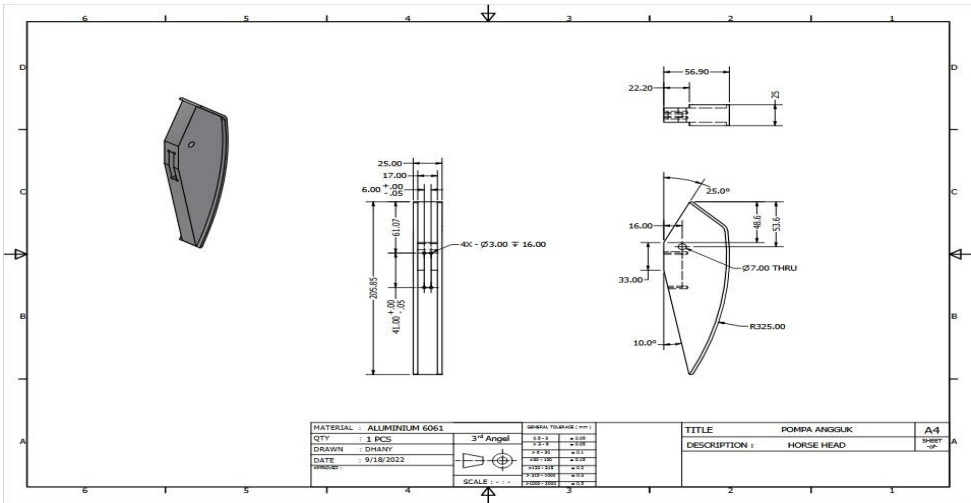


Fig. 7. Horse heads

3.2 Process Making

Machines and tools used for the process of making the pump nodding diorama are milling machines and CNC Milling machines . For the CNC Milling process was not carried out by the author due to time constraints on moment workmanship. As for step process for do process on Frais machine :

1. Learn object Work so that know order and process what to do especially formerly.
2. Prepare tool protector self like glasses And wearpack .
3. cleaning vise especially formerly so that No There is chips that remaining.
4. Install buffer in the lower object Work, put object work on mouth vise Then hitA little by A little object temporary work tighten vise.
5. Choose arbor in accordance endmill Which used, Then install arbor on round spindle machine And insert endmill to in arbor the while lock arbor - with strong, so that endmill not easy to get off.
6. power on round spindle on machine, Then settings object Work with method touch object Work onrotating end mill . If it is about the workpiece then that is where the zero position to start food on Work Unit.

7. Set the rotation speed of the machine according to the material used, if the conditions are really ready step furthermore is do work in accordance *drawings* object Work For make dioramas pump.
8. Do checking every do food with use period shove.

For process making Name group And Name company made with use machine *cutting acrylic* ,step step operation machine as follows :

1. Prepare files design
2. exporting files design with formats .dxf
3. Open *software* Which used For operate machine *Laser Cutting Acrylic*.
4. Arrange *power* and *speed* Which moment needed *cutting* process and *engraving*.
5. Put acrylic on table Work And turn on *power* main > *water chiller* > *exhaust fan* > *laser power* .

Following are some results making part with use machine *CNC Milling* and machining *Frais* :

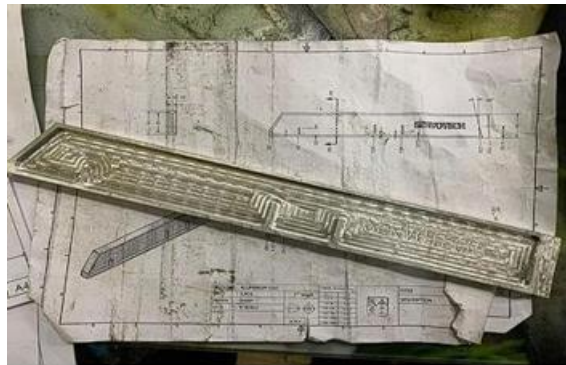


Fig. 8. Walking Beam Assy



Fig. 9. Samson Post



Fig. 10. Horse Head

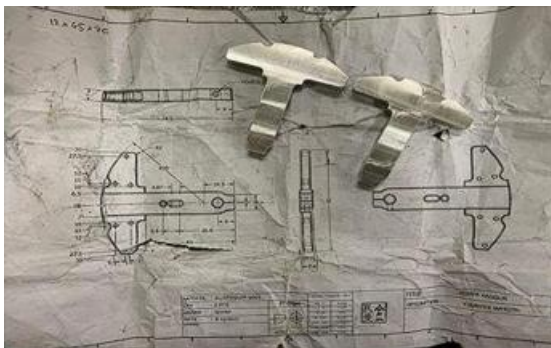


Fig. 11. Counter Weight

3.3 Component Dioramas Pump nod

To work on the bobbing pump diorama project on the motor part, a motor with a torque spec is used motor with speed specs. If you use a motor with a speed spec, the rotation on the motor is not capable lift round on pump. Used motorcycle with type

torque Which have *power* maximum 25watt , to produce slow rotation and use the *Vbelt* tool with a size of 220 mm. Whereas for the size of the *pulley* diameter one uses *pulley* with a size of 14 mm, for size two diameter *pulleys* using a 25 mm size with grooved *pulleys* . On the potentiometer and adapter use a 12 volt size , as for component other like *switch on/off* , *sockets female* And on part light use 2 light highlight LEDsmini with size 1 watt coloured Red as light around the pump.

parts that have been made will be assembled or assembled so that they become a beautiful diorama later it will move like the original bobbing pump. Before *assembly* first check *part* oneone by one using calipers or calipers and make sure that each item is the right sizedrawn. For results assembly of dioramas nod pump can look on picture under This :



Fig. 12. Dioramas Pump nod

The diorama of the pump nodding is also tested before being handed over to the company, to find out what just a problem that occurred during assembly, in the first trial it was carried out for 24 hours without being turned off and no problem whatsoever. The second trial was carried out again and at 8 hours of diorama testing, it was found sound contained in the *counter weight* . The cause of the *noise* is due to the lack of lubricant Which given on the *bushings* And *counters weight* , Because lubricant very important For help movement. SoThe solution to this problem is to provide grease or grease to the *bushings* and *counters weight* so that no more *noise* occurs and the movement of the diorama runs smoothly. For electricity And dynamo mover No happen problem on moment assembly And testing, everything walk with fluent.

4. Conclusion

The making of the Pompa nodding diorama has a function as a tool in presenting it to many people guys about how it works and introduce the parts to the bobbing pump. The bobbing pump is A tool heavy Which There is in mining Which have function For suck oil earth from lower land. The manufacturing process uses lathes, milling machines and *CNC milling machines* , before entering the process the machine needs a working drawing or *drawing* to make work easier, *the software* used for making working drawings is Inventor and for the CNC Milling process using MasterCAM. A designer must be really careful in making working drawings so that the delivery of information is very clear such as the size of the pump *part* , the material used in the manufacture so that errors do not occur at the time manufacture. Material Which used on dioramas This is aluminum, Because aluminum No easy rusty and for the manufacture of bases *or* houses for dioramas using wood. For the driving part use a torque dynamo so that the load can be lifted and don't use a *speed dynamo* because of this dynamo won't strong for lift *horse heads* And *walkim beam assy* on the pump.

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