



STUDY OF FUEL EFFICIENCY ON TUG BOATS WITH USE OF FLOWMETER WEB BASED MONITORING AND CONTROL SYSTEM IN P.T. X

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ABSTRACT

In order to increase efficiency, a monitoring system has been doing for measuring operational performance existing. After a system created and used, usually management can measure performance and take action anything to improve the efficiency. With all information that has been collected, management will be able to produce a decision accurate and take action to increase productivity and efficiency operational. P.T. X after implementing the installation of flow meters in all ships and have examined in research before, now deeper by applying the use of flow meters which internet use web-based as a sensor long-distance, as to be monitored anytime and wherever with by use of a sensor equipment named eGenKit. For that the study is done to assess the use of fuel efficiency on tug boats with use web-based monitoring and control system in P.T. X.

Keywords : digital, eGenKit, flow meter, fuel oil consumption, tug boat.

1.0 INTRODUCTION

The measurement of the flow of fuel is very important in management process of fuel in a ship. An instrument for measuring the flow called flowmeter. This device serves to determine how much fluid required in the process of continuous and how a fluid in distributed, fluid referred to fuel oil in a ship. The measurement of fuel now is also intended for energy efficiency which was trying to managing and controlling the use of energy in their company that could have dividend more, so can increase cash flow to remain competitive in the market, give a bonus more to an employee and increase advantage to shareholders [2].

At the sea, energy sources for fuel must be managed, controlled and made more efficient. The cost of fuel is expenditure largest indispensable both on shipboard and in a building. Factors that have brought inefficiency fuel is [3]: wrong design for ship (for example like the calculation size of propeller, machine, and others), a lack of competence crew especially that associated with operation and management, the theft of the fuel and the quickness supervisory to support operational especially times in dealing with the problems. In order to increase efficiency, a monitoring system to do for measuring operational performance existing. After a system created and used, usually management can measure performance and take action anything to improve the efficiency. With all

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the information that has been collected, management be able to produce a decision accurate and take action to increase productivity and efficiency of the operational problem.

P.T. X after implementing the flowmeters in all ships her and has examined in research before. From the research before [4] P.T. X group is a company that moves in information technology, resources, energy, mining logistic & services. P.T. X group owned company shareholder in systems integration, ranging from Information Technology business process outsourcing / employment, services logistician / carting, business oil and coal mining. One of subsidiary of P.T. X is company services provided sea transportation that focuses on sea transportation which includes a barge intensity and ship for transporting coal, ranging from dredging, loading-unloading until transporting. One large project of that company have established cooperation with the government for transporting coal to nuclear power plant (PLN) in Pelabuhan Ratu, West Java.

P.T. X have some of tug boat, a small vessel assigned to pull or push larger vessels in port. Besides the tug is also serves to draw barges contains coal which comes from treatment coal plant to be brought to the port place and after that carried out to the trucks. Now the research much deeper by applying the use of flowmeters using the internet use web based as a sensor remotely so could be monitored anytime and wherever with by use of a sensor equipment named eGenKit. That is why the study is done to assess the fuel efficiency on tug boat using executive web-based monitoring and control system in P.T. X.

2.0 PROBLEM IDENTIFICATIONS

The problems faced by P.T. X is [5]:

- How to election the type of flowmeter which suitable for tug boat 2060 HP in this case there are two tug boats i.e. tug boat Titan 21 and Titan 23, with great vary fluctuations rpm machine;
- How to application installment in a ship adapted with spaces in an engine room and system fuel;
- How to monitor or analyzes the use of flowmeter has been consistent with the objectives of installment that creation for the use of fuel in a ship.

In this research, P.T. X developed the installation of flowmeter with use the web-based sensors so that can be controlled by the use of fuel wherever and anytime by using eGenKit. Sensors set to be fitted in each the ship is:

- Fuel Consumption sensors 2 pieces those in the in-let and out-let, type sensors fuel-consumption is flow meters corilois owns by the Emerson, size 1/4 inch;
- Bunker sensor 1 pieces to be installed in a pipe filling-bunker, type sensors bunker is flow-meter corilois owns by the Emerson, size 3 inch;
- Rpm sensors 4 pieces, 2 in play engine (Main Engine) and 2 in Generator Set (Auxiliary Engine).

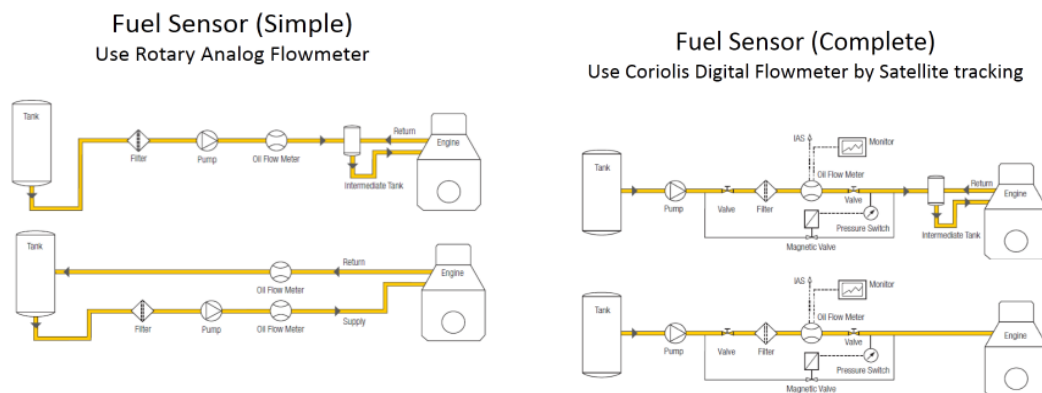
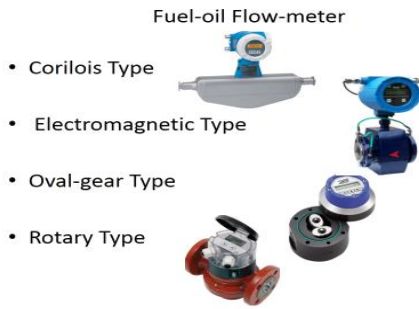


Figure 1. Flowmeter Diagram Analog and Digital System

Types of flowmeter [1]:



Flowmeter discussed is the type rotary analog Aquametro brands and type digital coriolis Emerson brands. Flowmeter type rotary analog Aquametro brands used only on system discharging fuel and not used on system filling bunker. The use of satellite system to report online only done on flowmeter type digital coriolis Emerson brands on system discharging fuel and also a system of filling bunker.

3.0 RESULTS AND DISCUSSION

3.1 Research Location

The object previous studies located on the island of Batam to the construction of ships that uses eGenKit there are two ships i.e. tug boat Titan 21 and 23. After that observation and data processing brought from location where the tug boat sailing was between port from Pelabuhan Ratu to Kotabani, Bengkulu.



Figure 3. Sailing between port Pelabuhan Ratu-Kotabani, Bengkulu

3.2 History of Fuel Consumption per trip [6]

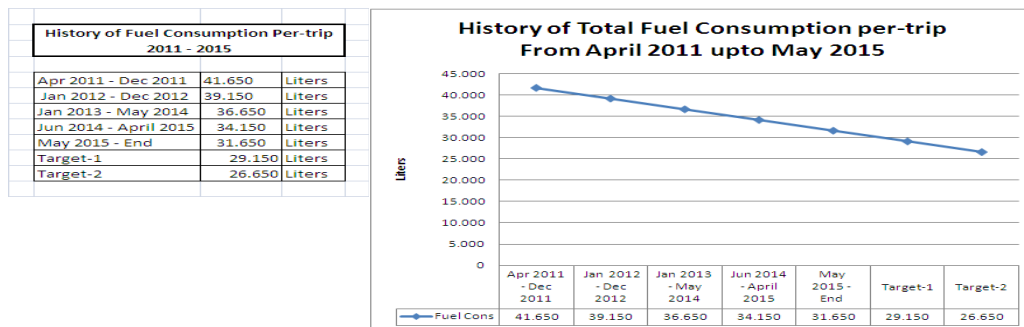


Figure 4. History of Fuel Oil Consumption per trip

3.3 Ship Fuel Oil Consumption

Table 1. All the Ship Fuel Oil Consumption

Name of the Ship	Actual	Target	Unit
TB.Titan 03/06	14,779	15,268	Litre
TB.Titan 03/06	45,744	47,942	Litre
TB.Titan 05/04	29,448	31,650	Litre
TB.Titan 07/08	27,855	31,650	Litre
TB.Titan 07/08	26,544	30,456	Litre
TB.Titan 09/10	24,503	31,650	Litre
TB.Titan 09/10	19,664	30,456	Litre
Titan 70	39,435	60,000	Litre
TB.Titan 11/12	52,923	52,734	Litre
TB.Titan 13/14	45,223	52,734	Litre
TB.Titan 15/16 A.	31,411	31,650	Litre
TB.Titan 15/16 B.	30,166	31,650	Litre
TB.Titan 17/18	44,555	52,734	Litre
TB.Titan 19/20	51,293	52,734	Litre
TB.Titan 21/22	27,434	30,456	Litre
TB.Titan 23/24	29,620	30,456	Litre
Average	36,040	40,948	Litre

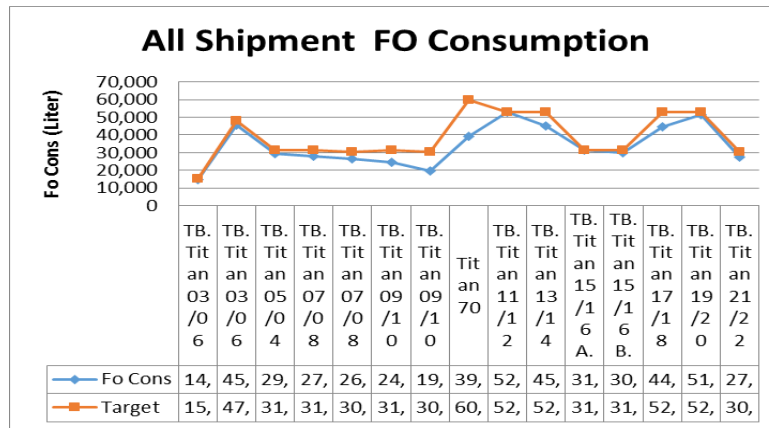


Figure 5. Graph of All the Ship Fuel Oil Consumption

3.4 eGenKit Identification

eGenKit is a system based on monitor long-distance web-based and solutions to control and helps the company make a decision accurately to optimize its operation. eGenKit consist of:

- a) panel localized (hardware) to be fitted on board, and
- b) server centralized (to store data and management).

eGenKit does not require software which enable the user have access to the ship all the time and anywhere. eGenKit uses transmission data hybrid between GPRS and satellite to produce a data transmission cost cheaper and can coverage revenue thoroughly.

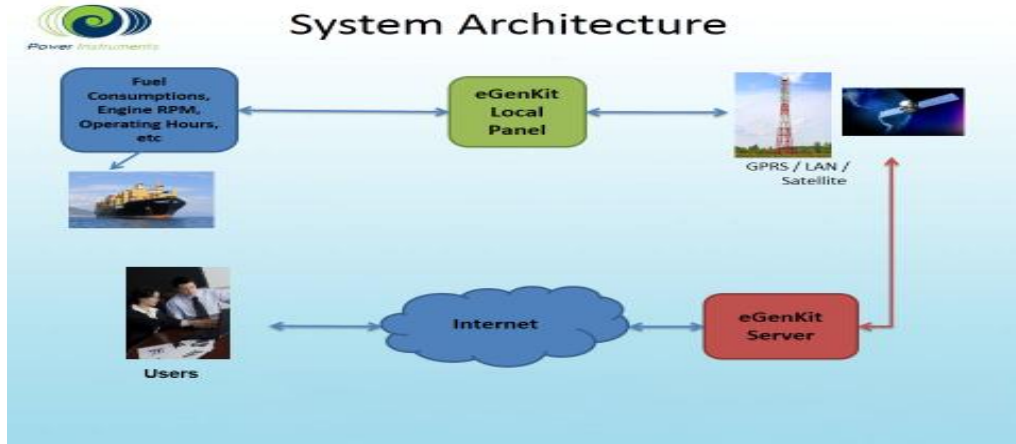


Figure 6. System Architecture of eGenKit



Figure 7. Login Page

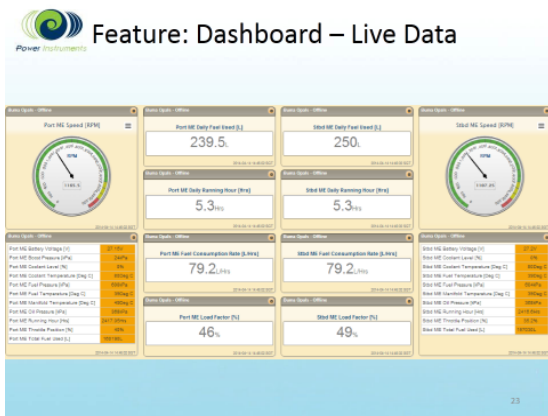


Figure 8. Dashboard Display

3.5 Fuel Oil Consumption of the Ship which Used eGenKit

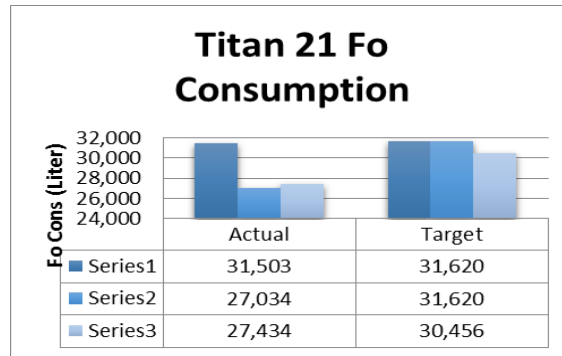


Figure 9. Fuel Oil Consumption of Titan 21

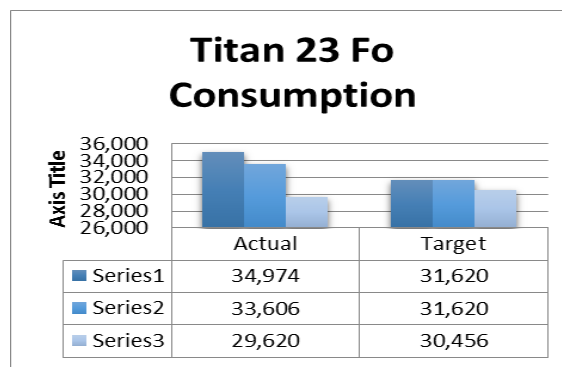


Figure 10. Fuel Oil Consumption of Titan 23

4.0 CONCLUSIONS

1. From the consumption of fuel can be seen there has been a target as follows:

Titan 21	Actual	Target	Unit
April	31,503	31,620	Litre
May	27,034	31,620	Litre
June	27,434	30,456	Litre

Titan 23	Actual	Target	Unit
April	34,974	31,620	Litre
May	33,606	31,620	Litre
June	29,620	30,456	Litre

2. Will be conducted socialization in all ships on the target fuel efficiency, currently has been running in some ships and there are good reception from crew members of the ship.
3. Furnish equipment for fuel-sensor, fuel-monitoring, fuel-security, including: equipment fuel-sensor package to new ship (Titan 25, Titan 27, Titan 29 and Titan 31), there are 3 choice, namely:
 - eGenKit, package 1 flowmeter corilois and rpm censorship, GSM transmitter,
 - Broil, package 4 flowmeter oval-gear and rpm censorship, GSM transmitter.
 - Aquametro, package 4 flowmeter rotary and CCTV rpm + GSM CCTV transmitter.

ACKNOWLEDGEMENTS

Thank you very much to the Darma Persada University which have funding this research and give an opprtunity to attend the conferences.

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