

EE/CprE/SE 491 WEEKLY REPORT 2 (9/21/19 – 10/6/19)

Group number: sdmay20-27

Project title: Gauss Sensor for Magnet Array Filter

Client: Dennis O'Neel

Advisor: Dr. Mani Mina

Team Members/Role:

Muhammad Lutfi Latip -Team Manager

Irfan Rafie – Test Engineer

Vishal Patel – Meeting Scribe

Muhammad Aiman Zulkefli – Research manager

Wei-nee Long – Report Manager

o Weekly Summary

The objective for these 2 weeks was to discuss on the early design of the Hall Effect Sensors that is to be used for the Magnet Array Filter (MAF). Moreover, another aim was to discuss on the aspects of the sensors regarding on the following topics:

1. Sensitivity of the sensors
2. Models to be used on early data collection for research
3. Design of the Hall effect sensor probes around the magnet ring collars

Based on the topics listed above, we successfully created an early design of the Hall effect sensor probes that is to be latched around the magnet ring collars in getting data on particle buildups around the filter.

On top of that, the team successfully discovered few models of the Hall sensors from different companies that can be used for testing and comparing on their sensitivity and accuracy. Aside from that, we had initiated an early design of the software for the sensor that is connected to

Arduino in converting analog data into digital that is to be used and transferred to the computer to be shown to the user.

o Past week accomplishments

- *Everyone: Introduction of each Team Member and their background*
 - o First meeting with the whole team members, advisor and the client in getting to know each other and warming up to work together for the whole 2 semesters ahead
 - o Introduction on the background of the project, goals, functional, economic and environmental requirements that are set by the client and discussed with the whole team

- *Everyone: Discussion on Timeline and Budget*
 - o Discussed with the client on the overall timeline of the project, and overall budget estimation to be used later throughout the 2 semesters

- *Irfan, Vishal, Aiman: Current Gauss and Eddy Current Sensors and their capabilities and limitations*
 - o Researched on implementation of gauss and eddy current sensor that is to be used in detecting particle buildups in the filter and the oil engine.
 - o Discussed on the capabilities of the sensors in requiring data with having other ambient sources that has effects in the sensitivity of the sensors.

- *Lutfi: Research on other sensor technologies that might be worth investigating*
 - o Continuous research on other available sensors that can be utilized for this project that can yield better result and more efficient.

- *Irfan: Early Framework of the Coding for the Software*
 - o Initiated with early design on the code for the software that is to be used in connecting the sensor probes and Arduino in getting data measurements

- The software helps in converting analog signals from the sensor probes into digital signals to be used in recording data of the change in magnetic field caused by particle buildups in the filter
- The data will be used in early development of the threshold indicator for changing filter that will be further discussed in its implementation
- *Lutfi, Vishal: Research on temperature effects towards accuracy in getting data*
 - Gained knowledge on how temperature would affect the sensors in its accuracy of acquiring data

○ Pending issues

- *Everyone: Research more how temperature and vibration affect EM properties*
 - Need to conduct test bench and collect data regarding the change in EM on different type of sensors during different conditions.
- *Everyone: Research about the Clients patent*
 - Need information regarding the Client’s product and how the magnetic field changes when the iron particles accumulate around the filter.

○ Individual contributions

NAME	INDIVIDUAL CONTRIBUTIONS	HOURS THIS WEEK	HOURS CUMULATIVE
Muhammad Lutfi	Helped in research for available sensors and sent a request to Texas Instrument and Honeywell on acquiring sensors for educational purposes, that is to be used during the test bench	12	24
Irfan Rafie	Researched on the GUI and started on the coding of the software for the sensor with	12	24

	Arduino in data acquisition later during the testing		
Vishal Patel	Designed a first draft of the project design for the sensors and their optimal position to be latched on the magnet collar	12	24
Muhammad Aiman	Completed Report 2 and researched on details of available sensors that can be used for our design	12	24
Wei-nee Long	Helped in planning the upcoming week duties and presentation.	12	24

o Plans for the upcoming week

- *Everyone: Acquiring gauss meter from ETG or Ames Laboratory*
 - o Need to obtain gauss meter from either the ETG or Ames laboratory to be used for testing
- *Irfan Rafie: Emailing Dr. Brian Steward*
 - o Email him on introduction of the whole team, the project ongoing, and asking permission on using his laboratory for research and testing purposes
- *Wei-nee Long: Research on Temperature Sensors*
 - o Look into how we can implement the sensor in calibrating with the hall effect sensor in getting data, having temperature as a variable in fixing data measurements from the sensors.
- *Vishal Patel: Research about the design*
 - o Research on improvements and other modifications that can be made to the design of the sensor

o **Summary of weekly advisor meeting**

- Successfully outlined the duties that need to be done in the following weeks which includes research on the design, obtaining sensors from different companies to be used during testing, and collecting data regarding gauss measurements.