# Design of a Flow Velocity Meter for Tides in the River

# Using Arduino

Sanya Samaimak1 and Shanin Harnnarong1

**ABSTRACT**

The Royal Irrigation Department is responsible for managing water availability in Thailand. Many instruments are used to read the data to obtain the needed hydrological data. The instruments that it has applied to measure the velocity of the tide are the flow velocity meters A-OTT C31 that compatible with the audio and numerical displayer Z 41-00. They have been used for 30 years, (1988 - 2018).

Design of a flow velocity meter for tides in the river using Arduino was presented in this paper. It was designed to use as a substitute for the audio and numerical displayer Z 41-00 that were broken. The result of the design and the experimentation show the ability of working together with the flow velocity meters A-OTT C31 and the accuracy of the data acquired from this designed instrument are satisfactory.

**Keyword:** The Royal Irrigation Department, Flow Velocity Meter, Arduinos

**Introduction**

Mechanical velocity meters

1 Department of Instrumentation Engineering, Faculty of Engineering, Rajamangala University of Technology Rattanakosin, 96 Moo 3 Salaya Phutthamonthon NakhonPathom 73170, Thailand

\*(Corresponding author, e-mail) : sanya.sam@rmutr.ac.th

**Materials and methods**

**1. Signal form A-OTT C31**

|  |  |
| --- | --- |
|  |  |
| **Figure 1** A-OTT C31 | **Figure 2** A-OTT C31 Signal |

**2. Block diagram**



**Figure 3** Block Diagram

**3. Flowchart**



**Figure 4** Flowchart

**Results and discussions**

**1. Testing at 20 Hz, 200 Hz, 1 kHz and 2 kHz**

|  |  |
| --- | --- |
|  |  |
| **Figure 5** Test bench. |

**Table 1** Test results at 20 Hz

|  |  |  |
| --- | --- | --- |
| **Oscilloscope** | **Serial Monitor** | **Summary** |
|  |  |  |

**Table 2** Test results at 200 Hz

|  |  |  |
| --- | --- | --- |
| **Oscilloscope** | **Serial Monitor** | **Summary** |
|  |  |  |

**Table 3** Test results at 1 kHz

|  |  |  |
| --- | --- | --- |
| **Oscilloscope** | **Serial Monitor** | **Summary** |
|  |  |  |

**Table 4** Test results at 2 kHz

|  |  |  |
| --- | --- | --- |
| **Oscilloscope** | **Serial Monitor** | **Summary** |
|  |  |  |

**Conclusions**

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

**Acknowledgements**

This research was supported by the Institute of Research and Development, Rajamangala University of Technology Rattanakosin. In addition, the authors would like to thank Mr.Voravot Boontong, Hydrologic Instrument Standards Branch Chief, working in Hydrology Division, Bureau of Water Management and Hydrology for all his help and suggestions. Thankfulness to the supporters : Mr.Jetsdaporn Satansup, Mr.Ruangsimon Jamkrajang and Mr.Pawaritsorn Chaisong for all their support throughout the period of this research.

**References**

OTT Hydromet. 2017. A-OTT C31 [Online]. Available: http://www.ott.com/products.

Arduino Language Reference [Online]. https://www.arduino.cc/reference/en.

Makarn, Eakachai. 2009. Learn Understand and Use the AVR Micro controller family with

Arduino. Bangkok: ETT Co., Ltd. (in Thai)

เอกชัย มะการ. 2552. เรียนรู้ เข้าใจ ใช้งานไมโครคอนโทรลเลอร์ตระกูล AVR ด้วย Arduino. กรุงเทพมหานคร:

บริษัท อีทีที จำกัด.

Polpananavee, Pramoht. 2011. Principle of Water Flow calculation through Irrigation

Structures. Bangkok: Regional Irrigation Office 8. (in Thai)

ปราโมท พลพณะนาวี. 2554. หลักการคำนวณน้ำผ่านอาคารชลประทาน. กรุงเทพมหานคร:

สำนักกรมชลประทานที่ 8.

Leevajanakul, Kirati. 2000. Hydrology. Bangkok: Rangsit University Press. (in Thai)

กีรติ ลีวัจนกุล. 2543. อุทกวิทยา. กรุงเทพมหานคร: สำนักพิมพ์มหาวิทยาลัยรังสิต