



# TEXAS A&M UNIVERSITY CORPUS CHRISTI

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## **Trip Report: Gulf of Honduras Tides Training (Guatemala & Honduras)**

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### **Background**

Mr. James Rizzo from the Conrad Blucher Institute for Surveying and Science, Division of Nearshore Research at Texas A&M University-Corpus Christi (TAMUCC DNR), was invited by NOAA's Office of Coast Survey to participate in 2010 hydrographic training for Guatemala and Honduras. Funded by the Gulf of Honduras Project and MesoAmerican Caribbean Sea Hydrographic Commission, this training is part of a multi-agency, international initiative to build hydrographic capacity in the three countries that encompass the Gulf of Honduras (Belize, Guatemala, and Honduras). TAMUCC DNR presence was requested to (1) provide training on tide/water level measurement, and (2) assess current capabilities for water level measurement. Training for hydrographers from both Guatemala and Honduras was conducted simultaneously from 24-25 / 27-28 May 2010, at Puerto Cortes, Honduras, and 26 May 2010 at Santo Tomás de Castilla, Guatemala.

### **Trainer Schedule**

*Sunday, May 23, 2010* – Travel to San Pedro Sula, Honduras. Upon arrival I met Mr. Elliot Arroyo-Suarez (U.S. NAVOCEANO), at the airport in San Pedro. Travel to Crown Plaza hotel in San Pedro Sula.

*Monday, May 24, 2010* – Picked up at Crown Plaza in San Pedro by personnel from the Porto de Cortes and traveled to Puerto Cortes. Checked into Villa Del Sol in Puerto Cortes and then to the Port facility to commence Tides Training.

*Tuesday, May 25, 2010* – Continue training at Puerto Cortes office. All personnel in attendance made an initial site visit to the tide station at Puerto Cortes.

*Wednesday, May 26, 2010* – Picked up by van and traveled to Santo Tomás de Castilla, Guatemala; inspected the tide station at the port.

*Thursday, May 27, 2010* – Mr. Arroyo-Suarez continued training on Sounding Datum determination using the "Sounding datum by water transfer" method following Canadian Hydrographic Service (CHS) procedures. In addition, the use of datums for hydrographic surveying was covered extensively.

*Friday, May 28, 2010* – Mr. Arroyo Suarez continued training on hydrographic surveying practices and procedures. Certificates were handed out to the training participants. The training was concluded by an additional site visit to the tide station at Puerto Cortes.

*Saturday, May 29, 2010* – Driver from the Port picked us up at the hotel and took me to the airport in San Pedro Sula, departed 11:45 am.

### **Classroom Training Outline**

- |                                                                       |                                                         |
|-----------------------------------------------------------------------|---------------------------------------------------------|
| A. Introduction                                                       | G. Tide Station Structures / Installations              |
| a. Center for Operational Oceanographic Products and Services (COOPS) | H. Tide Station Site Reconnaissance                     |
| b. Water Level Observation Network for Central America                | I. Documentation                                        |
| c. Tides Training                                                     | J. Installing a Tide Station                            |
| B. Review of Tide Training CDs (distributed to trainees)              | K. Benchmark Networks                                   |
| C. Tide Station Vocabulary                                            | L. Leveling to a Tide Station                           |
| D. Background – Why do we need a Tide Station?                        | M. GPS Observations                                     |
| E. Tools and Equipment Requirements                                   | N. Data Collection, Database Operations, Data Archiving |
| F. Tide Station Components                                            | O. Tidal Datums                                         |
|                                                                       | a. Definition                                           |
|                                                                       | b. Usage                                                |
|                                                                       | c. Data Processing                                      |
|                                                                       | P. General Discussion / Questions                       |

### **Training Objective(s) & Accomplishments** (reference Classroom Training Outline above)

1. Install a Water Level Station (WLS) – Reviewed all aspects of WLS installation:
  - Site selection
  - Structure selection and installation
  - Instrumentation selection and setup
  - Instrumentation operation and maintenance
2. Understand Tide Data – Reviewed data collection and processing for water level datums. Described how datums are calculated from instrumentation. Discussed use of datums in non-hydrographic applications (i.e. construction, coastline mitigation, marsh restoration, etc.).
3. Understand Data Application – Discussed how data provided by instrumentation are used during hydrographic surveying; made adjustments to surveys using WLS data.
4. Provide Data Access – Established a web page in the TAMUCC DNR database; imported data and information from the WLSs at Puerto Cortes, Honduras, and Santo Tomás de Castilla, Guatemala.

### **Water Level Station Assessments**

1. **Puerto Cortes**
  - a. **Data Collection Platform (DCP)** installed is obsolete and not operational. The manufacturer (Stevens Vitel) no longer supports the installed VX1100 DCP, but

many of the sensors are current and operational in many U.S. networks (e.g. NOAA NWLON stations).

- b. **Water level sensor** is a standard Aquatrak™ acoustic sensor installed following NWLON procedures.
  - c. **Wind sensor** is an RM Young 5103 anemometer, also a standard NWLON sensor.
  - d. **Batteries** have most likely not been replaced since the station was installed sometime back in 2001.
  - e. **Maintenance**
    - i. Condition of the station indicates that there has been little/no maintenance since installation.
    - ii. It is uncertain as to the availability of equipment that can be used in the operation, maintenance, or repair of any systems or sensors installed; a few basic hand tools were available from one of the technicians/trainees.
2. **Santo Tomás de Castilla** – General condition of the station is poor overall. This station was likely originally constructed with the same equipment and materials as the Puerto Cortes WLS, but it has not been maintained and many original components (as listed above for Puerto Cortes) have either been destroyed or removed. The general locale of this WLS may be used for a future installation.
3. **General Comments** – Between the two stations visited on this trip, only some of the Puerto Cortes WLS infrastructure and remaining equipment may be salvaged; this station is closest to being capable of collecting IHO grade water level measurements. However, both stations require significant repair and attention to be functional. It is this trainer's impression that the collection of long term datasets and tidal datums were not critical factors during the initial installation of these stations.

### **General Observations**

1. **Personnel** – Eighteen (18) individuals total from the Puerto Cortes (Honduras) and Puerto Barrios (Guatemala) hydrography divisions participated in the training. Several trainees were interested in the electronics of the visited tide stations but none seemed familiar with the instrumentation currently installed.
2. **Integration of Data Sets** – The Guatemalan and Honduran personnel have no way of archiving or viewing data collected from their respective tide stations. TAMUCC DNR established a web site for the WLS in Santo Tomás de Castilla, Guatemala. Not enough information was available to set up a site for Puerto Cortes.
3. **Valeport 740 Knowledge** – Personnel from Guatemala had basic understanding in operating the Valeport 740 at Santo Tomás de Castilla, but their setup of the system was not completely correct. Proper setup was discussed and demonstrated during the WLS visit.

## **Recommendations / Way Ahead**

1. **Access to Data** – Data retrieved from the Valeport 740 pressure sensor gage at the Santo Tomás de Castilla location were used to set up a station in the TAMUCC DNR database; no information was available to set up the Puerto Cortes station. Once these WLSs are operational and station information is provided, the data will be available for review at <http://lighthouse.tamucc.edu/qc/187> for Santo Tomás de Castilla and a website to be determined for Puerto Cortes. Individuals from each port will be granted password access to the data collected from the two stations. TAMUCC DNR offers this service as a professional courtesy until such time as other arrangements can be made for the data.
2. **WLS Maintenance & Operation** – WLS installations at Puerto Cortes and Santo Tomás de Castilla should be relatively easy to maintain if new equipment is installed. To support continuous data collection, monthly maintenance visits should occur for inspection, cleaning, and data recovery. Data recovery from the Valeport 740 should be conducted weekly and the sensor inspected monthly. Verification of sensor movement should take place quarterly.
3. **Santo Tomás de Castilla WLS Installation** – Installation of the tide station at Santo Tomás de Castilla closely followed standard protocol established by NOAA CO-OPS for hydro stations. I suggest relocation of the sensor stilling well to a location better protected from random damage or vandalism. Additionally, it is suggested that the station be placed in a location that provides greater elevation above Mean Sea Level, such that data collection during natural events can continue without interruption or damage.
4. **Leveling** – While hydrography personnel from both countries understand the basic requirements for leveling at tide stations, more training on benchmark networks and leveling should be conducted, including explanations of the levels and associations with the water level sensor, benchmarks, and datums established.

## **Concluding Narrative**

As is the case with many capacity building efforts, the proper installation, operation, and maintenance of any new tide monitoring equipment in this region requires funding, additional classroom and field training/experience, structured database management, and formal documentation. The expansion of a monitoring station network in the Gulf of Honduras is essential to the health of the Caribbean Sea, the Gulf of Mexico, and all other connecting bays, estuaries, and waterways. Additionally, inhabitants on/near the Gulf of Honduras (commercial or private) will benefit from products that incorporate collected tidal data, including updated navigational charts, water level and storm surge predictions, and recreational forecasts. TAMUCC DNR is honored to have been given this opportunity to train the Gulf of Honduras Project participants and stands ready as an option to help expand the region's water level monitoring capability and capacity.