

Gravity Benchmark Database

Posted on October 27, 2010

Originated From: Justin Smith (UH) on Wed, 27 Oct 2010

Hi,

This is Justin Smith, I am a tech aboard the R/V Kilo Moana.

We are currently sailing in the South Pacific. We would like to locate gravity benchmarks with known absolute gravity readings in Apia Guam, Suva Fiji, and Nuku'alofa Tonga. I am sure that other research vessels equipped with gravimeters have put into these ports and needed to establish land ties in the past. Does anyone in the tech community have knowledge of these gravity benchmarks? Is there a database of gravity benchmarks in ports frequented by UNOLS vessels? Any assistance would be greatly appreciated!

Cheers,

-Justin

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Reply from: Dale Chayes (LDEO) on Wed, 27 Oct 2010

The "classic" source of tie info is:

"International Gravity Measurements" by George P. Woollard and John C. Rose, 1963 published by the Society of Exploration Geophysicists. It has info for the "old" pendulum (absolute) gravity sites. I didn't see any listed for Guam, Fiji or Tonga.

http://gis.utep.edu/index.php?option=com_content&view=article&id=278%3Agravity-base-stations-guam&catid=50%3Agravity-base-stations&Itemid=54

shows two for Guam, one of which:

Mass and Balance Room at the NAVY Calibration Laboratory on the Naval Air Station, Guam is an absolute station:

http://gis.utep.edu/images/PACES/STATIONS/GUAM/DESC.GUAM_AA.JPG

There is a report at:

<http://www.gsj.jp/Pub/CRUISE/no.17/17-04.pdf>

has a value for a shore site.

Didn't find anything for Tonga.
-Dale

Reply From: David M Martinson (LDEO) on Wed, 27 Oct 2010

Justin,

I have attached information for Suva, Fiji and Nuku'alofa, Tonga. I scanned in documents here on the Langseth. I will keep an eye out for anything on Guam (which I thought was here), and forward on to you if a discovery is made. Sorry I cannot answer your question as to whether or not there is a database of gravity benchmarks.

Regards,
david

Attachments:

- [SuvaFiji.jpg](#)
- [Tonga Tonagtapu3771-1.pdf](#)
- [Tonga2Tie Photos.pdf](#)

Reply From: Anthony Johnson (LDEO) on Wed, 27 Oct 2010

All,

In addition to the UTEP site, which is excellent, David Winester at NOAA pointed me to an online database maintained by the Bureau Gravimetrique International, for global station information:

<http://bgi.omp.obs-mip.fr/index.php/eng/Data-Products>

Anthony

Reply from: Val Schmidt (UNH) on Wed, 27 Oct 2010

Ethan Gold and I once searched all over Guam looking for the tie marker. After many misadventures we finally located it near the southwest corner of the old airport terminal building. I do not know from what source Ethan had metadata, but it was old, yellowed and typewriter typed and there were far too few digits in lat/Lon to make the search easy. If you can't tell, the whole afternoon was great fun.

I've attached a GE view if the building, remarkable by the martini glass shaped supports for the roof. (not viewable in the overhead image unfortunately)

Best of luck!!!

Val

Reply from Justin Smith on Wed, 27 Oct 2010

I want to thank all who responded, I think that we are well set up now! We are all fortunate to be part of such a responsive community.

One thing I noticed through this exercise is that there IS an abundance of this important information held by the many people with affiliations to the UNOLS fleet, however it is spread throughout the community, with pieces here and there.

I think we could all benefit by organizing some form a UNOLS database hosting this type of information and making it easily accessible to all in the fleet...

Thanks again!

-Justin Smith

Reply From: Dale Chayes (LDEO) on Wed, 27 Oct 2010

On Oct 27, 2010, at 13:48 , Justin Smith wrote:

> I want to thank all who responded, I think that we are well set up now! We are all fortunate to be part of such a responsive community.

You are welcome, I'm sure from all of us who responded.

> One thing I noticed through this exercise is that there IS an abundance of this important information held by the many people with affiliations to the UNOLS fleet,

in this case, mostly folks who take care of gravity meters, and there are others well outside the UNOLS fleet.

> however it is spread throughout the community, with pieces here and there.

One thing I could infer from your question is that you appear to be out there with a marine gravity meter (and presumably a land portable meter) and someone (now) expects you to do gravity ties but without all of the requisite info.

If that is true, it is unfortunate, and perhaps an indicator of the degradation of our ability to support our systems at sea now that we no longer have "in house" centers of domain knowledge that are closely tied to each vessel operation.

The fact that there is substantial expertise in a broad range of arcane fields that used to be tightly coupled to the vessels is one of the fundamental reasons this community has been successful in the past. In many domains, we have nearly or completely lost the "in house" domain expertise and have not replaced them successfully with shared or pooled resources.

I firmly believe that it is a mistake to think that archiving a few of the tangible fragments of our historical knowledge and having a clerk take care of them is a substitute for experience and expertise. I

also believe that if we can't afford the "staff" we are deluding ourselves that buying new "stuff" is cost effective.

In his book "Shop Class as Soul Craft", Matthew Crawford summarized the impact of Fredrick Winslow Taylor ("Principles of Scientific Management") and his disciples. Drawing on work by Harry Braverman ("Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century"), Crawford writes (p. 39):

".... Scattered craft knowledge is concentrated in the hands of the employer, then doled out again to workers in the form of minute instructions need to perform some part of what is now a "work process." This process replaces what was previously an integral activity, rooted in craft tradition and experience..... Once the cognitive aspects of the job are located in a separate management class, or better yet in a process that, once designed, requires no ongoing judgement or deliberation, skilled workers can be replaced by workers at a lower rate of pay....."

The short term result of this approach is supposed to be reduced cost to operate. In fact, there is huge risk of "failure to operate properly" and substantial long term consequences.

Two of the unintended consequences of the "codification" process are:

- loss of the commitment of long term "craft" folks (for want of a better term), their experience, and their commitment to making "their" ship or "their" instruments work well.
- the inability to respond in a time-efficient manner to newly emerging problems in locations where the domain expert can't simply pull up to the door.

> I think we could all benefit by organizing some form a UNOLS database hosting this type of information and making it easily accessible to all in the fleet...

Care and feeding of arcane instruments (ADCPs, multibeam, seismic systems, gravity meters, etc) should be delegated to folks w/ the expertise.

Jim Holik has apparently funded such a group for gravity meters.

-Dale

Reply From: Steve Poulos (UH) on Wed, 27 Oct 2010

Hi Justin-

I think Dale's response is probably the closest to my opinion of this and in general most issues that arise in connection with our jobs.

Have one of your tech mates get the gravimeter older log books and review. If these notebooks are onboard - they should be in the gravimeter locker area. The log books go back to the 80's. At least two of those ports we have tied to more than once and even possibly with the KM.

The information and location of the dock tie or near by tie would be in those books. Tonga tie I am not sure of.

The log books when done correctly (and which you should continue this practice) have a sketch of where the vessel tied up, to which pier, GPS coordinates, height of water (tide) in relation to the meter itself at the time of the tie and all kinds of info - basestation info. We used to do this religiously at every port stop - first with the old KK, then MWave, then early on with KM.

One possible strategy - might be to scan in these log sheets and put the tie locations in some sort of alpha order so as to locate easier in the future.

Steve
