

### AREA COST FACTORS IN HAWAII: FAKE NEWS?

By Joe Uno, CCP, LEED AP BD+C

With the increased use and reliance on computerized construction cost estimating programs, it is important to understand the underlying assumptions of the national databases upon which these programs rely to calculate their results. Oftentimes, budgets for capital projects are set by using national cost databases and adjusted to a locality by use of an area cost factor. In Hawaii, the use of these factors creates significant budget shortfalls when these projects move from concept to design and construction stages.

In my research, I compared actual raw costs in Hawaii (City & County of Honolulu) to Engineering News Record's (ENR) "Construction Cost Index" and "Building Cost Index". Additionally, I compared the costs of case studies published in ENR and Sweet's Square Foot Cost Books with similar projects in Hawaii. I compared cost elements from RSMean's "2016 Building Construction Cost Data Book, (BCCD)" with my findings of raw local costs. Finally, I compared the Area Cost Factors published by the U.S. Department of Defense in their UFC 3-701-01 "DoD Facilities Pricing Guide", ENR and Sweet's Square Foot Cost Books and RSMean's BCCD to my findings.

#### ENR Construction Cost Index and Building Cost Index

The ENR Construction Cost Index and Building Cost Index are both based on a few consistent data points. They both use three basic materials; Fabricated Structural Steel, Portland Cement and 2x4's as their basis for the Material Cost component. The difference between the two indices is in the Labor Cost component. The Construction Cost Index uses 200 hours of "Common Labor" and the Building Cost Index uses the average hourly wage of three "Skilled Workers"; Bricklayers, Carpenters and Structural Ironworkers as its basis of labor costs.

I calculated both a Construction Cost Index and a Building Cost Index for Honolulu based upon the same criteria as ENR using actual costs in Honolulu. This exercise showed that a theoretical "Area Cost Factor" to adjust ENR's Construction Cost Index to Hawaii is 1.3513 and for the Building Cost Index it is 1.3738. Use of a limited data set such as these would yield consistent or "reliable" results from year to year or from location to location. Yet, because of its limited number of data points, one should question the validity of any conclusions drawn by the exercise of comparing the ENR Construction Cost Index or the ENR Building

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### RAINBOW WARRIOR RACING SETS THE STAGE AT THE CAPITOL



*"Governor Ige's proclamation ceremony at the Capitol ground floor on July 13"*

A group of kids amongst giants. That was the feeling of the UH Manoa Rainbow Warrior Racing team as they smiled, shook hands and rubbed shoulders with giants like District 33 Representative Sam Kong, Marketing Director of 7-Eleven Hawaii Edna Ching, KHON2 Reporter and Sports People Hawaii host Howard Dashefsky, and of course the Governor himself, David Ige—an alumnus of the UHM College of Engineering! It was difficult to stay composed with the hoard of cameras, the sleek shine of the race car, multitude of interviews, and the electric excitement in the air. However as the energy settled and the Governor took his place at the shimmering koa wood podium, all eyes and ears were focused and attentive.

With the proclamation in his hands, Governor Ige outlined the accomplishments of the 2018 team at the Formula SAE design competition this past June in Lincoln, Nebraska. Their accolades included a placing of 2nd in Fuel Efficiency, 10th in Business Presentation, and 14th Overall out of more than 80 competing teams from all over the nation and around the world. The Governor then brought the message home, stressing the importance of City Resolution 18-73, urging for the return of a racetrack on Oahu after a 10 year hiatus.

The relatively recent movement aims to instill a professional, disciplined racing culture and accelerate STEM learning through the science of automotive applications. Supporters firmly believe that high school auto shops, community college technical and trades courses, and of course UH Manoa's Formula SAE competition team would see benefit from a safe, designated, regulated testing track.

With that, Governor Ige closed his speech and handed over the signed proclamation as his congratulations to the team, and left not without first taking a seat in the race car, eyes

beaming, shaka held high for the final paparazzi barrage.

Although the proclamation ceremony was nothing short of grand, the turning point in RWR's success story starts far away from any cameras or newsreels. In mid April, the team was fortunate enough to attend the First Hawaiian Bank International Auto Show at the Hawaii Convention Center—a

feat made possible entirely through the generosity of the Sports Car Club of America (SCCA) Hawaii Region community. Although the team was excited as ever to display their vehicle and attend the event, there was no way for them to foresee the true gift of that opportunity.



*"The team's competition vehicle on the track"*

The Friday of that weekend, the team met Li Cobian and Scot Shimamura—two long-time motorsports fans, with a host of various accolades under their belts. The duo work with the D.R.A.G.G. (Drag Racing Against Gangs and Graffiti) Hawaii chapter, a program supporting at-risk youths through auto shop education. Most notably in recent times, they have been at the forefront of the recent push for the return of the Oahu Raceway Park, via Councilwoman Ann Kobayashi's Resolution 18-73.

Li and Scot immediately became interested in the team, whose message and means resonated well with their background and involvements. Since the encounter, Li has acted as a marketing representative for the team, seeking and coordinating sponsorships, and importantly, being the first real link between the local community and the team.

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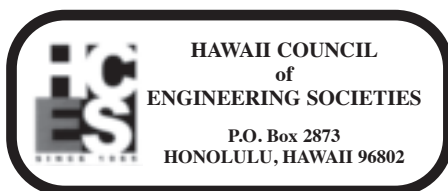
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#### WILIKI MAILING LIST

Additions and/or corrections to the Wiliki mailing list should indicate the proper society, institution or association. Corrections to email addresses should be submitted to your society coordinator.



HOME PAGE: [hceshawaii.org](http://hceshawaii.org)  
EMAIL: [hcesorg@gmail.com](mailto:hcesorg@gmail.com)

#### 2018-2019 OFFICERS

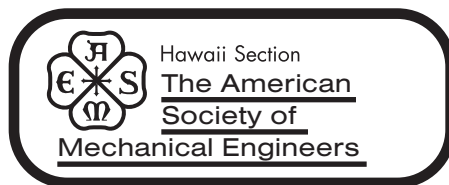
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[www.asme-hi.com](http://www.asme-hi.com)

#### ASME-HI 2017-2018 Officers

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HCES Rep: Froilan Garma  
Alternate: Derick Kam

#### NEXT ASME-HAWAII PROFESSIONAL MEMBERSHIP MEETING

Date: September 11, 2018, Tuesday

Time: 5:30 pm to 6:45 pm

Place: Johnson Controls, 420 Waiakamilo Road (map and parking instructions found on the Hawaii Section website)

Agenda: A copy of the agenda will be on the Section website.

As usual, all members and guests are invited and encouraged to attend our meetings. There are always lots of complimentary refreshments. Please contact Chairman Froilan Garma for directions and for more information, such as parking.

## Wiliki Advertisers Wanted

Newly-elected President Claire Fukuoka and Vice-President Cristina Rodriguez attended this year's annual Western District Institute of Transportation Engineers (ITE) Conference held in Keystone, Colorado, between June 23rd-27th, 2018. They took a red-eye flight from Honolulu Friday evening and participated in the various kick-off events the following day including assisting with the Hawaii 2020 Local Arrangement Committee (LAC) booth and the annual MiteY Race for which they placed first place in the family and friends division. Throughout the conference, they had the opportunity to meet various transportation professionals from the western district; attend leadership meetings, most notably the Leadership Breakfast where they met other chapter and section leaders and discussed future plans for the district; and participate in technical sessions, including an 11-mile long bike tour through Breckenridge, Colorado, which has been designated as a Gold Level Bicycle Friendly Community by the League of American Bicyclists. The conference culminated with the annual awards banquet which had a 70s disco theme this year. All in all, they had a lot of fun representing the Hawaii ITE section and can't wait to attend next year's conference to be held in Monterey, California. In addition to Claire and Cristina, 9 other transportation professionals from Hawaii also attended the conference.

#### ASME-HAWAII EXECUTIVE COMMITTEE MEETING FOR JULY

Date: July 17, 2018, Tuesday

Time: from 5:30 pm to 6:45 pm

Place: Johnson Controls, 420 Waiakamilo Road  
Agenda: 1) debriefing of the completed Francis R. Montgomery Design Competition including improvements incorporated, further actions required, and transfer of funds for annual competitions, 2) a possible EIT/FE refresher or study course, 3) finalize the selection of volunteers for the 2018-2019 Group leadership positions and submitting required annual reports to headquarters, and 4) finalize plans for the mattress manufacturing plant tour.

There will be no ASME-HI P.E. Refresher course this year because our organizer-coordinator-instructor, Raymond Liu, is not available. The 2018-2019 Group leadership team will remain the same for another year. They request your suggestions for possible tours and meeting speakers.

Summary of the meeting minutes will appear in the next Wiliki issue.

#### PASSING MEMBER

We are sad to report the passing of member Thomas M. Ikehara on February 23, 2018. Thomas was Vice-Chairman of the Hawaii Section in the 1990's. He retired from Molokai-Maui Electric as chief engineer. He is best remembered for his organizing and planning the Hawaii Section tour up Mauna Kea and visiting one of the observatories. Thomas spent his later years between the Big Island and Kaneohe, with trips visiting his daughter in Vancouver, WA.



#### Hawaii Section 2017-2018 OFFICERS

[www.aacehawaii.com](http://www.aacehawaii.com)

President: Maelyn Uyehara  
Vice Pres.: Christopher Kanae  
Secretary: Kristy Kastner, PSP  
Treasurer: Cristo Rojas  
Dir Soc. Med.: Joseph Uno, CCP, LEED AP BD+C  
Past Pres.: David Ladines

#### AACE Site Visit: American Savings Bank Campus

On Friday, June 29, eighteen AACE Hawaii Section members and guests participated in a construction site visit of the new American Savings Bank Campus downtown headquarters location.

Led by Paul Belshoff, EIT, Project Manager and Construction Inspector at Levett Bucknall, the AACE group toured the 10-story office building to experience and learn about its architectural and engineering features, such as the stunning interior central staircase and electronically controlled tinted windows. The ASB site area of 327,533 SF is comprised of 99,881 SF in office space, 11,000 SF of first level and lobby areas, and a parking garage to hold 520 vehicles. The building's structure is valued at \$56 million and the interiors at \$15 million, and construction is expected to be completed in early 2019.



#### 2017-2018 ASCE Hawaii Section Officers

President: Lara Karamatsu, P.E.  
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 YMF President: Jordan Urabe, E.I.T.  
*email: jurabe@ascehawaiiyfmf.org*

#### EXECUTIVE COMMITTEE MEETING

Last held: Tuesday, July 3, 2018

Next meeting: August 2, 2018

#### INFRASTRUCTURE REPORT CARD

The Committee continues to coordinate and meet with various agencies for data gathering efforts and to discuss the objectives and field any questions and/or concerns. Preliminary category reports were targeted for early August submittal to the review committees. Additional volunteers are welcome -- if you would like to participate, please contact Lara Karamatsu, *lkaramatsu@ascehawaii.org*.

#### CONTINUING EDUCATION

Please visit <http://www.ascehawaii.org/links.html> and click on ASCE National for complete details.

#### July Lunch Meeting – Big Island (Hilo)

The annual neighbor island meeting was held on July 17, 2018 at the Hilo Yacht Club. Neil Azevedo, Highways Division Maintenance Chief from the County of Hawaii, Department of Public Works, presented an inside look into the experiences and challenges Road Division has faced in dealing with the incredible force of nature. County of Hawaii crews have been responding to fissure eruptions and lava flows since April 2018 while maintaining public safety and transportation corridors for responders and evacuees. Big MAHALOs to Bruce Meyers, Lennie Okano-Kendrick, Melba Quiocho and the gang at Okahara and Associates – Hilo office for their assistance in coordinating the luncheon meeting.

#### August Dinner Meeting

Date: August 16, 2018

Location: HASR Bistro; 5:30 PM Social Time, 6:30 PM Dinner, 7 PM Program

Speaker: Dr. Panos Prevedouras; Autonomous and Driverless Vehicles- Hype, Reality and Sample Major Impacts

Elections for the 2018-2019 slate of new officers for the Hawaii Section will be held at the August meeting. Reyn Hashiro, an Associate at Yogi Kwong Engineers, has accepted the nomination for the Secretary position.

#### SAVE THE DATE! 2018 Outstanding Civil Engineering Awards Banquet

Date: September 13, 2018

Location: Waiialae Country Club

#### 2018 ASCE Walter Lum Scholarship

Congratulations to the 2018 recipients of the ASCE Walter Lum scholarships: Joshua Agpaoa, Kristin Dembia, and Bing Hu.

#### 2019 MRLC

Hawaii Section's Younger Member Forum will be hosting the 2019 Western Multi-Region Leadership Conference on March 7-9, 2019 at the Hilton Hawaiian Village. Attendance is anticipated to attract approximately 400 attendees from Regions 8 & 9 and Society leaders. If interested in assisting, please contact Conference Co-chairs Norman and Amanda at *yfmf.hawaii@gmail.com*.

#### Committee Positions

ASCE Hawaii is looking for volunteers to fill the following committee positions: History & Heritage Chair, Advocacy Captain, Student Practitioner Advisor and Report Card Committee members. If you are interested or have questions on any of these positions, please contact President Lara Karamatsu, *lkaramatsu@ascehawaii.org*.

#### Dream Big DVDs

A big MAHALO goes out to all who have been very generous in the Dream Big DVD Drive! ASCE Hawaii Section achieved the initial goal of raising money to provide a DVD to all middle and elementary schools in the State. The Section has now expanded our goal to provide a DVD to each of the private schools in the State. If interested in making a donation for the remaining Hawaii schools to receive a Dream Big DVD (\$5 each), please contact Lara Karamatsu, *lkaramatsu@ascehawaii.org*.

#### Upcoming Regional and National Meetings

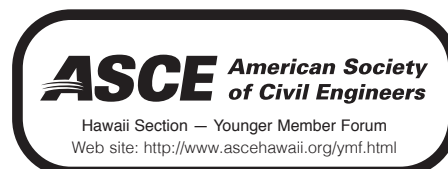
Hawaii Section President-Elect Eric Arakawa and Vice President Jason Kage will be attending two upcoming meetings:

Region 8 Assembly Meeting: September 7-8, 2018 in Spokane, WA

President & Governors Forum: September 23-24, 2018 in Reston, VA

#### Membership

If you haven't already done so, please renew your ASCE membership. You can renew your membership at [www.asce.org](http://www.asce.org).



#### 2017-2018 YMF Officers

Jordan Urabe, President  
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 Kapiolani Street, Secretary  
*kstreet@ascehawaiiyfmf.org*  
 Norman Leong, Past President  
*nleong@ascehawaiiyfmf.org*

#### YMF General Meeting

The next YMF general meeting is scheduled for Wednesday, August 1st, 2018 at 6:00 pm at Underdogs Sports Bar & Grill. If you are interested in attending and learning more about the various professional, social and service opportunities available through YMF, please contact YMF at *yfmf.hawaii@gmail.com*.

#### Kuliouou Ridge Hike

On Sunday, July 1st 2018, seven YMF members participated in a morning hike up to the top of the Kuliouou Ridge. The hikers started the climb at 9am and after an hour and a half of trading riddles the team reached the summit and embraced the views of East Oahu's mountains and shorelines. The thought of pizza was great motivation for the group to finish the hike strong. We all enjoyed the company and the delicious custom made pizzas from Pieology.



Kuliouou Ridge Hike

#### Storm Drain Markers

On Saturday, June 30th, twelve YMF members volunteered to mark storm drains in a neighborhood of Pearl City. The volunteers were briefed on how to mark the storm drains by cleaning the sidewalk with both a wire brush and a hand broom, then placing an aluminum placard down using adhesive or spray painting the symbol using a stencil. The placard and stencil displays a fish and the words, "NO DUMPING. DRAINS TO OCEAN."

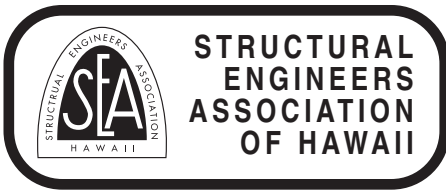
The purpose of making storm drains is to promote public awareness of storm water quality, as it sends the message to "keep pollutants out of the storm drain system." The City and County of Honolulu runs the Storm Drain Marking volunteer program, providing us with the storm drain marking kits and the training/safety tips necessary to perform our tasks.



Storm Drain Markers

**Deadline for  
 Wiliki  
 is August 15th**





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Web Page URL <http://www.seaoh.org>

#### 2018 BOD OFFICERS AND DIRECTORS

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Director (Yr 1)	Jillian Sumitomo	488-7579
	<a href="mailto:jillian@mkellc.com">jillian@mkellc.com</a>	
Past President	Jonathan Murai	791-3952
	<a href="mailto:jmurai@kaihawaii.com">jmurai@kaihawaii.com</a>	

#### PREVIOUS BOD MEETING

July 3, 2018

#### General Membership Meetings/Technical Seminars/Events

For all events see [seaoh.org](http://seaoh.org) or look for an email flyer for registration.

August's Programing Event is still undetermined, but could possibly be a geotechnical engineering event during the lunch hour combined with a full membership meeting. Please check the [seaoh.org](http://seaoh.org) for any upcoming information.

#### SEAOH Young Member Group

The SEAOH young member group has been reactivated!! A big Mahalo to the current committee chair Kevin Galvez for spearheading this task. Any young member (under the age of 35) is encouraged to participate in the group. Please contact Kevin at [seaoh.ymg@gmail.com](mailto:seaoh.ymg@gmail.com) for more information.

#### 2018 SEAOH Convention

The convention has been scheduled for September 14-15 at Aulani. Please check the events section on the [seaoh.org](http://seaoh.org) website for the convention save-the-date form. Speakers are currently being finalized and a program agenda will be available soon. A block of hotel rooms have been reserved at Aulani for the convention, so book soon!!

#### 2018 SEAOH Scholarship Golf Tournament

The golf tournament has been scheduled for Friday, October 19, 2018 at Hoakalei Country Club. A save-the-date form has been posted on the website. The tournament is the main source of revenue for the SEAOH college scholarships that are given every year. This year, SEAOH is planning to award four \$3,000 college scholarships, with one scholarship being reserved for a student who may not be pursuing a structural engineering degree. Please check the events section on the [seaoh.org](http://seaoh.org) website for information on the scholarship application.

**Next Meeting** on August 1, 2018. For information, contact SEAOH President; Jeffrey Cudiamat [jcudiamat@structuralhawaii.com](mailto:jcudiamat@structuralhawaii.com)



#### CMAA Hawaii Chapter

<http://hawchapter.cmaa.org>

#### 2018 CMAA Hawaii Chapter Board

President	Brook Corney (CH2M)
Vice President	Alex Pascual (Bow CM)
Secretary	Ranella Ho (SSFM)
Treasurer	Emily Boirum (Bowers + Kubota)
Chap Past Pres	Chandra Namumnart (EKNA Services)

#### CMAA Hawai'i Chapter News:

Aloha CMAA Hawai'i! On Thursday, July 19th the CMAA Hawai'i Chapter held its speaker luncheon at Dave & Busters in the Paina Hale Room. The guest speaker was Jason Locklin, CEO and Founder of CloudCompli. Information was shared regarding the Stormwater Compliance App.

On Saturday, July 28th, a Community Service Event at the Hale Mauiola project at Sand Island Parkway was held. Everyone attended worked very hard constructing hand rails, cleaning and working on landscaping.

On Saturday, July 21st, a CCM Application Class was held at HCC and it was FREE. The class was taught and developed by Tim Bramsen CCM with assistance from Lydia Yee PE, CCM. It helped those interested in getting their CCM Certification, planning to take this year's PCM class in August or have questions about the application process.

CMAA is announcing the 2018 Scholarship offering to assist students planning to pursue or are pursuing a degree in Construction Management. Two scholarships of \$1,000 each will be awarded to qualified students at the September CMAA meeting. The criteria for qualification has been sent out via email. Information regarding our next speaker lunch in August will be shared via email.

The CMAA Professional CM Course will be held August 1 – 3 at HCC. As shared in the past, our chapter is here as a resource for all Construction Engineering and Management professionals, and the things that we do benefit not only our CM community but our larger Ohana as well.

If you have any questions regarding any of our upcoming events, would like to join our Ohana and become more involved with the CMAA Hawai'i Chapter or would simply like to be added to our email list, please email us at [hawaii.cmaa@gmail.com](mailto:hawaii.cmaa@gmail.com), or at our mailing address; CMAA Hawai'i, PO Box 531, Honolulu, HI 96809.

Looking for a CCM? The current listing for all Hawai'i CCMs can be found here: <https://cmaanet.org/certified-construction-managers-registry>. Safety always.

#### AREA COST FACTORS continued from page 1

Cost Index to actual costs.

#### Engineering News Record Material Costs

ENR regularly reports on the cost of several building materials from 20 major U.S. cities. I compared actual Hawaii costs with ENR's 20 City Average cost of the same materials which include; Lumber, Plywood, Drywall, Insulation, Metals, Masonry, Concrete, Paving, Aggregates, and Pipes. I found that material price factors in Hawaii range from 0.771 to

7.966 when compared to the 20-City average costs. The overall average factor, derived by the sum of all the material price factors in Hawaii divided by the total number of items sampled is 2.038.

#### Engineering News Record Labor Costs

I researched the prevailing wage rates of the 22 construction trades which are included in ENR's 20 City average wage rates, 3rd Quarter 2014. The data shows that the overall average factor of Hawaii labor costs over the ENR 20-city average rates, derived by the sum of all the labor rate factors in Hawaii divided by the total number of labor categories sampled is 1.210.

It is important to note here that these factors are the result of a purely objective comparison of local wage rates to a national average and do NOT reflect productivity or other economic measures. This is important when attempting to explain evidence of actual costs that are different than mathematically derived factors and indices.

#### Engineering News Record Square Foot Costbooks

ENR publishes an annual "Square Foot Cost Book" and the Sweet's "Architect's Square Foot Cost Book". These publications include Case Studies of recently constructed projects, In-Place Unit Costs and Metro Area Multipliers.

These two books show the Metro Area Multiplier for Hawaii as 1.38 over the 20 City Average Costs. The following are my findings of the costs of a few recent projects in Hawaii and their comparison to the Locally Adjusted ENR and Sweet's Square Foot Cost Books' Case Studies of similar buildings.

#### Student Housing

According to "Sweet's Architect's Square Foot Cost Book", the Square Foot Cost a student apartment complex in Hawaii is derived by multiplying the calculated square foot cost by the Metro Area Multiplier for Hawaii:  $\$93.51 \times 1.38 = \$129.04/\text{s.f.}$  A new dormitory was constructed at the University of Hawaii Hilo for 300 students and cost \$27.850 million. The actual square foot cost in 2013 equals the total cost of the facility divided by the total square footage:  $\$27,850,000/119,883 \text{ s.f.} = \$232.31$ . I calculated the multiplier for this facility by dividing the Actual Square Foot Cost by the Calculated Square Foot Cost:  $\$232.31/\$93.51 = 2.48$ .

#### Parking Garage

According to "ENR's 2015 Square Foot Cost Book", the anticipated square foot cost for a parking garage in Hawaii is  $\$41.47 \times 1.38 = \$57.23/\text{s.f.}$  A new 429 stall, 217,905 s.f. parking garage was recently completed on Oahu for \$29,330,000. The actual square foot cost was  $\$134.60/\text{s.f.}$  I calculated the multiplier for this facility by dividing the Actual Square Foot Cost by the Calculated Square Foot Cost:  $\$134.60/\$41.47 = 2.48$ .

#### Tire Store

In the "Sweet's Architect's Square Foot Cost Book", a the anticipated square foot cost of a Tire Retail Store in Hawaii is  $\$70.95 \times 1.38 = \$97.91/\text{s.f.}$  We were recently working on a new 21,965 square foot full service car care center whose estimated cost is \$10,767,000 for the building portion. The actual estimated square foot cost is  $\$490.18$ . We calculated the multiplier for this facility by dividing the Actual Square Foot Cost by the Calculated Square Foot Cost:  $\$490.18/\$70.95 = 6.91$ .

The significant differences in these few sample projects should make us question the validity of the Metro Area Multipliers published by

*continued on page 6*



# STRUCTURAL SYSTEMS, INC.

General Engineering • Foundation Systems • Micro Piles

**MICRO PILES** As defined in FHWA-RD-96-016 "Micro-piles are small diameter drilled and grouted reinforced piles used for both structural support and insitu earth reinforcement." Typically less than 10" in diameter, allowable design capacities frequently exceed 100 kips and our crews have performed testing in excess of 225 kips or over 100 tons. Micro-piles are frequently used where a deep foundation system is required in difficult substrata conditions, or where driven piles or large diameter systems are impractical due to subsurface obstructions, or limitations presented by existing buildings at or adjacent to the project site.

## Capabilities, Benefits & Advantages

- Limited Access and Low-overhead Equipment
- Design/Build Projects
- FHWA Compliant
- High Bearing & Tension Capacities (100 Tons)
- New Construction
- Cased or Un-cased Systems
- Hollow-bar Injection Anchors & Piles
- Atlas & Chance Helical Piers
- Remedial Underpinning
- Foundation Releveling
- Load Transfer
- Soil Nails, Gunite
- Slope Stabilization
- Compaction Grouting
- Uretex, Slab Releveling

### Low-overhead Equipment

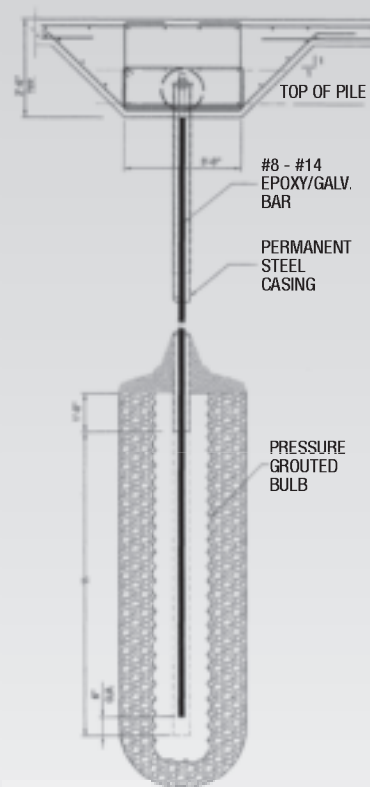


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## AREA COST FACTORS

continued from page 1

ENR. What are the circumstances that contribute to the significantly higher real world factors when comparing case studies to similar projects in Honolulu?

### RSMeans

RSMeans is recognized in the industry as an authority on construction cost data. They research and publish annual Cost Data Books and provide soft copies of their databases that work with several of the more popular construction cost estimating programs. With their databases working with your estimating program, you have access to thousands of unit prices and assemblies. Ideally, applying an Area Cost Factor to the estimate should "localize" the pricing.

### Material Costs

Material costs from 30 major metropolitan areas, plus a few from other significant markets are gathered to create RSMeans' Material costs. Bare material costs are marked up by 10% for profit but not for overhead or sales tax.

I researched and compared the local costs of the 65 items which make up the R.S. Means Key Materials List. I found that material price factors in Hawaii range from 0.610 to 23.245 when compared to the same 65 items in the R.S. Means Key Materials List. The overall average factor is 2.026. This factor, based on actual, researched material costs in Hawaii, contrasts with the RSMeans City Cost Index for Materials in Honolulu of 1.250. The difference between the factor derived from actual research into local costs and the RSMeans City Cost Index for Materials in Honolulu is significant and brings into question the validity of the RSMeans factor.

### Labor Costs

The Labor rates used by RSMeans are an average of labor rates in 30 different cities across the United States. Direct labor rates include fringe benefits and carry markups for both profit and overhead. I compared the National Average rates with Hawaii's rates and found that the overall average factor is 1.254. This is in contrast to the RSMeans City Cost Index for Labor of 1.197. Like the ENR Labor Factor, the factor is an objective sampling of labor rates and there is no accounting for productivity or other economic impacts.

I interviewed a Construction Superintendent who has experience across the United States to estimate of the productivity of the local workers compared to his national experience. His answer was that he only got half the productivity he had come to expect through his years of experience. It is important to note that 50% productivity equals double the cost. Even if this information was somewhat exaggerated, the fact that the RSMeans Labor Factor does not capture local productivity is significant.

I also queried the General Superintendent of a large Public Works project about his assessment of construction labor costs in Hawaii. His observation was that the "Boom and Bust" cycles of the local construction market along with our relatively small market do not provide consistent opportunities for tradesmen to gain skills and experience compared to their counterparts on the mainland. This has significant impact on output and productivity.

While the difference between the factor derived from actual research into local costs and the RSMeans City Cost Index for Labor in Honolulu is relatively small, anecdotal evidence suggests that there is a larger spread. Perhaps productivity and other economic factors needs

to be studied and added to these factors to increase their accuracy and validity.

### Equipment Costs

RSMeans gathers equipment rental rates from numerous sources throughout North America. I created a list of 18 pieces of typical construction equipment to compare to the equipment rental costs in the RSMeans BCCD. I found an adjustment factor of 1.084 over the rental rates found in the RSMeans BCCD.

The RSMeans City Cost Index for Hawaii is 1.226. If one applies this factor directly to the Unit Prices published in the RSMeans BCCD, I predict that the result will be severely short of the actual costs of a project in Hawaii. Similar to the ENR data sets, these indices are Mathematical Constructs which contain objectively gathered and measured facts about relatively small sets of construction cost data. Several important measures such as productivity, the level of competition, access to skilled and trained labor pools, the cost of living and other economic elements are not captured in the RSMeans Factors.

### U.S. Department of Defense Unified Facilities Criteria

The U.S. Department of Defense publishes UFC 3-701-01, the DoD Facilities Pricing Guide. This UFC is used to support the DoD's annual construction and engineering programs. It is updated frequently through Engineering Technical Letters and PAX Newsletters.

The recent PAX Newsletter, No. 3.2.1, Dated 28 March 2017, revised and updated the DOD Area Cost Factors to be used when preparing program level budgets. The DOD Area Cost Factor for Hawaii, using Joint Base Pearl Harbor Hickam as the basis is 2.27.

The RSMeans City Cost Index predicts that costs in Hawaii are 22.6% greater than their 20 City National Average and the DoD Area Cost Factor for Hawaii is 126%, a prediction of over TWICE the National DoD construction. These indexes predict only the costs of construction in Hawaii relative to their respective National Averages.

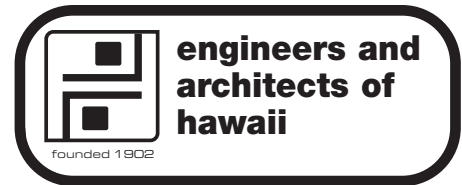
### Conclusion

As objective measures, the ENR Construction Cost Index, Building Cost Index, 20 City Material and Labor Cost Averages, the RSMeans Key Materials and lists of Average Labor rates are reliable sources of data. The data is collected in an organized manner and the results can be reliably calculated repeatedly with similar results.

In my opinion, where these publications fall short is in the validity of their indexes to accurately predict the cost of a construction project in Hawaii. My findings show that material costs in Hawaii are nearly twice the national averages. I have also noted that productivity and other economic impacts are not accounted for in the Labor indexes.

A comparison of the Case Studies found in the ENR Square Foot Cost books to real projects here in Hawaii shows how much higher it costs to construct a facility in Hawaii than on the Mainland U.S.. The Department of Defense's Area Cost Factor for Hawaii appears to more closely align with our findings when comparing the ENR Case Studies which shows that costs here in Hawaii are often more than twice those shown in the Case Studies.

Mr. Uno is President and Senior Estimator of J. Uno & Associates, Inc., a Hawaii-based cost engineering and estimating company founded in 1989. The opinions expressed in the article are his own.



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EAH's new meeting location is Room 301 in the Topa Tower (Ewa tower on Fort Street; Old AMFAC Building). Validated parking is available (enter from Nimitz). The WEB site has been updated to provide directions and a Map. If you have questions please call Sam Gillie (543-4739).

Meetings are held every Friday (except Holidays). Meetings start at NOON and have ended PROMPTLY at 1:00 pm for 70 Years. Program schedule may be adjusted. Call Sam Gillie to confirm speaker 543-4739; Fax 203-1335.

Lunch is \$10.00 Members, \$12.00 Guests. (All Welcome), Students Free. Drink refreshments are complimentary. You may bring your own lunches, in which case a \$2.00 donation is gratefully appreciated!!



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## RAINBOW WARRIOR RACING

continued from page 1

Via his experience with, and knowledge of the local automotive political climate, Li was able to link the team with the racetrack movement. Members of the team wrote testimonies and even attended hearing sessions at the Capitol for the resolution, speaking to the councilmembers on the educational standpoint in the need for a racetrack.

Further, Li made quick work to coordinate the team's vehicle display and attendance at local community events, such as the Aiea Family Fun Fair at Aiea High School on April 27, and the Auto Lunch Bunch at the Waikiki Yacht Club on May 3. Through these events, the team was able to network with like-minded gearheads, racers, and even other long-time-engineers. Most importantly, the team was able to share about the project with the community.

Although the racecar was mostly race-ready by the time the Auto Show rolled around in April, there were some major tasks for the year that were still unchecked--in particular, transporting the vehicle and supplies to Nebraska. In light of the short fuse timeframe at hand, Li Cobian quickly closed in on finalizing details with one of the team's previously initiated sponsorships, with air freight forwarding company Pacific Air Cargo.

The team was originally put in contact with Pacific Air Cargo's Vice President of Operations Tom Ingram through Rodney Awong, an auto enthusiast of the community who thoughtfully reached out after a Midweek newspaper publishing on the team back in December 2017. Pacific Air Cargo generously sponsored the vehicle crate shipping to Los Angeles, where the company is headquartered.

Meanwhile, Li reached out to 7-Eleven Hawaii for sponsoring ground freighting from LA to Lincoln, Nebraska. Edna Ching, Marketing Manager for 7-Eleven Hawaii, spearheaded the partnership with the team, and took on all communications between the third party trucking company and the student team as well. Through both Pacific Air Cargo and 7-Eleven Hawaii's generosity, and with Li's experience, shipping details were squared away and a major financial and logistical burden was relieved from the students.

With a firm shipping plan now in sight, the team quickly went to work. In just 3 days, they built their plywood shipping crate, packed up and strapped down supplies, and sent it on its

way.

A little less than three weeks later, the team landed in Nebraska on Monday June 18, two days before competition began. There they rendezvoused with their crate at the Lincoln Airpark, ready to take on the trying week ahead. The next 4 days were quite literally an emotional rollercoaster--filled with seemingly disabling challenges, practical problem solving, and successes. The team presented their business case to a panel of judges and defended engineering designs and cost analyses to industry professionals. They then passed a rigorous technical inspection on their first attempt, a hinging moment in building momentum for the racing events. Among other events included the 60 degree tilt test and braking test, both of which were passed on first attempt. A grueling, troublesome vehicle noise level test was surmounted on the fly with but a few minutes remaining to complete race trials.

When all was said and done, the team successfully completed all 5 racing events--a first for UH history--consisting of an acceleration drag race, skidpad figure 8 slalom event, nimble autocross race, and a brutal 22 kilometer endurance and efficiency finale. The team scored 561 points overall--more than doubling the previous best set in 2008--and placed 10th in Business Presentation and 2nd place trophy in the Efficiency event.

With the buzz and excitement of last Friday's proclamation ceremony still fresh in their minds, onlookers ponder, 'what next?' Although it truly was a long year for the graduated members of the 2018 team, those who follow closely believe them when they say that it truly is just the beginning. Graduated members strive to ensure that the lessons learned from this year carry over through RWR's ever-growing alumni network, and that the sense of community through sponsors and local outreach becomes stronger than ever. With these principles in mind, the possibility of a podium placing, state funding, Oahu racetrack, or whatever the team sets their minds to, may not be so far away. For the real victory comes not this year, or next, but decades from now, when high school freshmen choose UH Manoa's College of Engineering to design, build, and compete among the best through Formula SAE.

*The Rainbow Warrior Racing team would like to thank the many supporters of the program, whom this year's success could not have been possible without: Dr. A Zachary Trimble, Dr. Mehrdad Ghasemi Nejhad, Dr. Song K. Choi; DRAGG Hawaii Branch: Li Cobian & Scot*

Shimamura; 7-Eleven Hawaii: Edna Ching & Debbie Rojas; Pacific Air Cargo: Tom Ingram; Team Kalitta/Kalitta Air: Bob Lawson; SCCA Hawaii Region: Jennifer Parker; Boeing; Universal Manufacturers: Taylor Huang; Fiberglass Hawaii: Louis Melton; Cycle City; Hawaii Performance Technology; Thermal Engineering Corporation; Arrowhead Powersports; Sunset Powder Coating; and Xero Wraps.



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#### NEXT EXECUTIVE COMMITTEE MEETING

August 15, 2018, 11:30am, Sand Island WWTP

#### 12th BIENNIAL HAWAII WATER REUSE CONFERENCE

Theme:	Ho okahi Wai – One water
Dates:	November 29-30, 2018
Location:	Maui; Dunes at Maui Lani
Program:	Thursday – full day of presentations, including lunch Friday morning – half day of presentations, bento lunch Friday afternoon – recycled water facilities tour or golf outing
Cost:	\$155.00 for HWEA Members \$180.00 for non-members

For additional information and on-line registration, please visit the HWEA website: [www.HWEA.org](http://www.HWEA.org)

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