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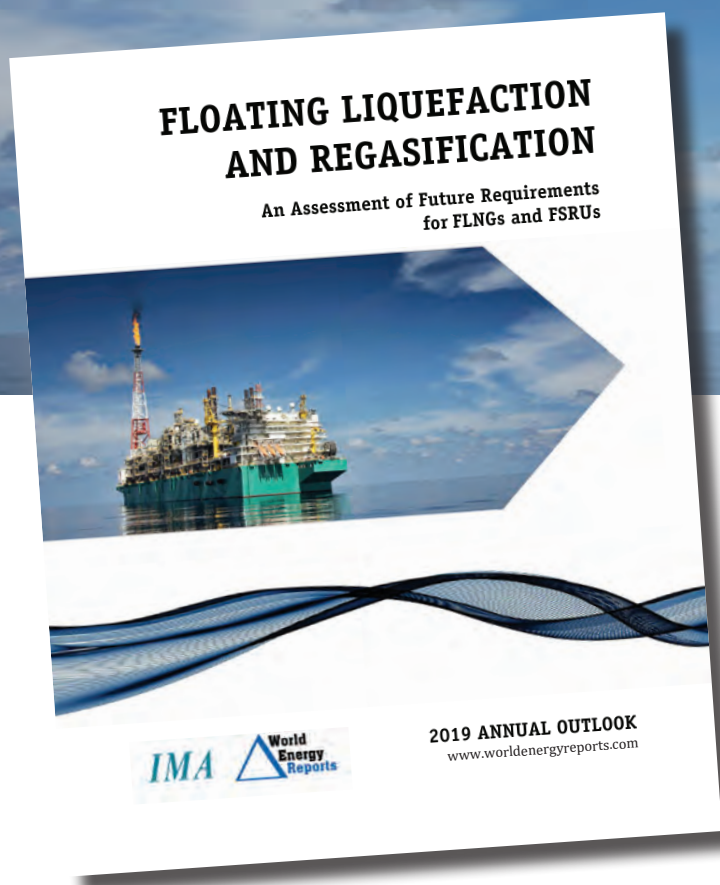
# White Papers



# REAL TIME ANALYTICS & REPORTS FOR THE FLNG/FSRU MARKETS



The LNG industry is going through a dramatic transformation. Our 2019 Annual Outlook and real-time FLNG/FSRU database is unique. It is not simply a static report, rather a dynamic and ever-changing database with a continuously updated wealth of data, statistics, exclusive insights and analysis and critical project management contacts designed to keep you a step ahead of the competition.



## THE 2019 ANNUAL OUTLOOK

**76**

### FLNG Projects Tracked

There are numerous FLNG and FSRU projects in the planning stage. Not all will move to development. To sort the likely from the unlikely we developed a methodology to rate projects based on specific “success drivers”.

**130+**

### Exhibits & Infographics

The 2019 Annual Outlook contains over 55 exhibits and more than 70 infographics, so that you can easily visualize the market data being presented.

**150+**

### Pages of Analysis

There are numerous FLNG and FSRU projects in the planning stage. Not all will move to development. To sort the likely from the unlikely we developed a methodology to rate projects based on specific “success drivers”.

## THE ONLINE DATABASE



We don't just provide a snapshot of the floating liquefaction and regasification sector. Our online fully searchable LNG database updates all of the project information on a 24/7 basis. As we receive new information about projects from our network of industry contacts, the database is immediately updated to reflect the latest situation.

Database users are able to select any combination of data about projects and export the data to excel for evaluation – or use the sorting and graphics provided with the database for making comparisons and benchmarking.



The FSRU database is a revolution in market insight, it provides real time analytics and information... Everything you need to stay informed of developments in the Floating Liquefaction and Regasification sector.

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## Water & Wastewater Treatment

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# PANEL DISCUSSION: Marine Regulations and Toxic Chemicals Sewage Treatment

By Alan Fleischer, [aflischer@sciencofast.com](mailto:aflischer@sciencofast.com) | Submitted by Jennifer Cisneros, [jcisneros@biomicrobics.com](mailto:jcisneros@biomicrobics.com)

At the recent SNAME annual meeting and expo, held at the Rhode Island Convention Center in Providence, RI, Alan Fleischer discussed the Sewage Treatment Regulations and Toxic Chemicals” to a panel called “Contemporary Issues Facing the Maritime Industry. Alan Fleischer was originally the President of FAST<sup>®</sup> Systems and work with St. Louis Ship Co. to provide the FAST<sup>®</sup> sewage treatment equipment for the towboats, barges, and ships. He authored many whitepapers, presentations, and articles for leading industry publications and marine-focused organizations, such as SNAME - which he has continuously attended since the 1970’s. The questions posed by the topic and panel discussion:

- What is the problem?
- What is the effect of quats on marine sewage treatment systems?
- Won’t certification testing prove performance in service?
- Are any land systems affected by quats?
- What can be done to keep a vessel in compliance?
- What are the current regulations and Conclusions regarding usage?

## What is the problem?

A class of disinfectants is being increasingly used in cleaning compounds and it threatens the ability of certified marine sewage treatment systems to meet USCG, MARPOL and VGP 2013 regulations in service. They are quaternary ammonium compounds, commonly referred to as “quats”, a handier name than “n alkyl dimethyl benzyl ammonium chlorides” for example. They can be found in toilet bowl cleaners, dishwashing detergents and rinses, floor cleaners and laundry products, all being used or capable of being used aboard ship.

## What is the effect of quats on marine sewage treatment systems?

As little as 2.0 mg/l will reduce the ability of a biological sewage treatment process to remove applied BOD5 and TSS.

## Why is that important?

Marine sewage is concentrated and MARPOL effluent requirements are tight. A very high percent removal of contaminants is required.

## With vacuum toilets?

Raw sewage concentrations in blackwater plus all graywater are about 400 mg/l for BOD5 (5 day biochemical demand) and TSS (total suspended solids). The effluent requirement for BOD5 is 25 mg/l and meeting this requires  $100\% - 25 / 400 \times 100 = 94\%$  removal. Similarly, the effluent requirement for TSS is 35 mg/l and meeting this requires 91% removal. By comparison, EPA only requires 85% removal for secondary treatment on land and that based upon a 30 day composite average.

## With conventional toilets?

Using modern 1.75 gpf toilets, raw sewage figures are about 340 mg/l BOD5 and TSS. To meet MARPOL requirements requires 93% removal of BOD5 and 90% removal of TSS, a bit lower removal percentages than with vacuum toilets but still pretty darned good treatment.

## Can’t membrane bioreactors meet effluent requirements despite some impairment?



A membrane can produce effluent with extremely low effluent BOD5 and TSS. But, in an MBR, the membrane is just one part of a suspended growth biological process. If the treating culture is killed or seriously impaired, the membranes will become fouled and be unable to process the sewage.

#### **What if the quat concentration is higher than 2 mg/l?**

A concentration of 10 mg/l will kill all beneficial microbial cultures in the treatment tank and prevent treatment of any kind. That is, the BOD5 and TSS in the effluent will be the equivalent of raw sewage.

#### **Won't certification testing prove performance in service?**

**Not necessarily.** Certification testing on land is normally performed at municipal treatment works which provide the source of the sewage.

- The municipal sewage is relatively dilute and primary sludge is added to meet minimum 500 mg/l TSS concentration required for the test.
- The reason municipal sewage is so dilute is that the sanitary sewage is mixed with stormwater due to crossover connections between sanitary and storm sewers (more common than you might think) and also because it is mixed with industrial wastewater.
- In fact, the amount of dilution is so great that the concentrations of toxic chemicals such as quats are reduced well below the level where they can affect the treatment processes.

***That is why these chemicals don't adversely affect municipal sewage treatment systems!***

#### **Are any land-based systems affected by quats?**

**Yes.** Municipal Waste Water Treatment Plants treat a primordial soup of all incoming waste streams. "Point source" or onsite treatment systems for single homes, subdivisions, highway convenience stores, etc. don't have the diluting benefit of stormwater and industrial wastewater, like WWTPs. Quats and other toxic chemicals can and do kill the biological treatment of small conventional systems. Advanced wastewater treatment systems can be adversely affected and impaired as well. We have delivered over 65,000 of these types of systems, including membrane bioreactors.

#### **What can be done to keep a vessel in compliance?**

Know what's in the cleaning compounds you are buying. Just about any cleaning compound you purchase will have an associated SDS (Safety Data Sheet) and/or MSDS (Material Safety Data Sheet). You don't have to be a chemist to read one, but you may think so from time to time.

All of these use the same standardized outline and have several sections of interest in this context. Google "How to read an MSDS". I have been advised that the manufacturer may try to paint as rosy a picture as possible. So, check out the ingredients shown in Section 3. You can look these up separately using the CAS (Chemical Abstracts Service) numbers, for example, Google "CAS 53516-76-0 SDS MSDS". You may have to search several SDS/MSDS for the subject chemical as your search will also bring up (a) other compounds that include that chemical and (b) SDS/MSDS that don't include the information you need.

#### **What are some words to watch for in on a Material Safety Data Sheet (MSDS)?**

- ***Toxic to aquatic life***
- ***Do not allow contact with soil, surface water or ground water***
- ***Avoid release to the environment***
- ***Not be allowed to enter drains, water courses or the soil***
- ***Hazardous for the environment***
- ***Harmful to aquatic life with long term effects***

#### **Some toxic chemicals don't cause problems**

As "toxic" as Chlorine is to microbial activity and considered a powerful oxidizing agent, it is used in water treatment process quite regularly. When it is added to raw sewage in moderate amounts, it is "used up" oxidizing organic matter and loses its disinfecting capability.



Phosphoric acid has been used on some cruise ships for years to bleach toilet bowls. The amount used is very small compared with sewage flows and it has little or no effect upon wastewater pH or treatment efficiency.

### **How do you control the chemicals you are buying and using?**

Large cruise ships, research vessels, etc. have large engineering staffs. But, most commercial vessels do not and this control may need to be exercised by the shore facility.

Control requires some vigilance. These cleaners can change formulations from time to time, even when they retain the same trade name.

#### **Alternate cleaners are available, inexpensive and effective.**

- Most if not all such cleaners use chlorine as the active disinfecting agent. It is inexpensive, very effective and readily available.
- As described above, it loses its disinfecting property when added to raw sewage and is no longer toxic.
- Quats are persistent. They are not “used up”, can accumulate in sewage sludge and come back into solution at a later date to do their damage.

It is my understanding that on some naval vessels, the approach is to raise the water temperature for laundry and dishwashing so high that no bacteria could survive. I believe that they also use chlorine in addition to temperature.

In one case, I was advised that the wastewater temperature was 195° F. For reference, a minimum of 160° F. is usually specified to achieve disinfection. The only caveat here is that the wastewater will have to be cooled before it can be treated. The microorganisms that treat sewage originate in the human body at 98.6° F. and are not effective at much higher temperatures. If there is one thing that naval architects and marine engineers understand it is the design and operation of skin coolers and this could eliminate any need for toxic chemicals.

### **What are the current regulations and Conclusions regarding usage?**

It is interesting that EPA VGP 2013 prohibits the use of toxic chemicals for discharge into the waterways and also prohibits their discharge into sewage treatment systems discharging into the waterways. VGP 2013 specifies the tests to be performed to verify “...minimally toxic soaps, cleaners and detergents...”

When I inquired of a major source of cleaning compounds about the tests specified in VGP 2013 I was advised that “Generally we do not conduct formulation level testing...”

It at least appears that we are type certifying sewage treatment systems that will probably not perform their intended function in everyday marine service.

I don't have all the answers – I wish I did. It may be that periodic sampling and reporting to the cognizant authorities is indicated as employed by State authorities in the USA. But, that is a matter for the regulating authorities to determine. If you develop any questions, thoughts, opinions, etc., I will be very interested. So, please feel free to contact me. We do have some resources as we have been in this business for over forty years. All that I ask is that you make it in writing as an email or a text because my hearing leaves a great deal to be desired.

#### **PARTIAL LISTING OF CLEANERS USED ABOARD A VESSEL SNAME WASTEWATER PANEL**

The following pages are a summary of an investigation into toxic cleaners affecting a sewage treatment system installed aboard a working vessel.

- Name and owner of the vessel are not germane to this discussion and will not be not be revealed.



- This is a printout from a working document and may not be as polished as it might be. Please excuse any inconsistencies, spelling errors, etc.
- Eight cleaners displayed are selected from some thirty two products that we have been informed are being used aboard the vessel. They provide a real world illustration of the subject of this presentation.
- Comments presented are not my opinions. They are direct quotes from the associated Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS).
- This example is unusual in our experience. We have never before experienced so many toxic cleaners being used aboard a vessel.

<u>Category</u>	<u>Chemical / Ingredient</u>	<u>CAS-No.</u>	<u>Description</u>	<u>Case</u>	<u>Dilution / Content</u>	<u>Comments</u>	<u>SDS/MSDS Source</u>
Housekeeping	Orange Force MS RTU		All Purpose			SECTION 6. Do not allow contact with soil, surface or ground water. SECTION 12. Harmful to aquatic life with long lasting effects. SECTION 13. The product should not be allowed to enter drains, water courses, or the soil.	ECOLAB
	dodcylbenzenesulfonic acid, sodium salt	25155-30-0			0.0123	section 12. Toxic to aquatic life with long lasting effects. SECTION 6. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.	Stepan
	sodium poly(oxyethylene) dodecyl ether sulfate	68585-34-2			1% - 5%	SECTION 6. Do not wash into the drains. SECTION 12. The product is toxic to aquatic organisms. SECTION 13. Do not wash into the drains.	Chemtrade International
	organic sulfonic acid salt	27323-41-7			1% - 5%	SECTION 6. Do not let product enter drains. Discharge into the environment must be avoided. SECTION 12. No data available. SECTION 13. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.	Guidechem
Laundry	Aqn Ltl Solid detergent		Detergent			SECTION 12. This material is toxic to aquatic life	ECOLAB
	sodium hydroxide	1310-73-2			42%	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise. The product itself and its products of degradation are not toxic.	ScienceLab
	alcohols, c12-16, ethoxilated	68551-12-2	an-ionic surfactant		5% - 20%	SECTION 6. Do not allow to enter drains or waterways. SECTION 12. Inhibition of degradation activity in activated sludge is not to be anticipated during correct introduction of low concentrations. Do not release into natural waters. SECTION 13. Must be incinerated in a suitable incineration plant...	BASF
	sodium carbonate	497-19-8			5% - 20%	SECTION 12. Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise. The products of degradation are less toxic than the product itself.	ScienceLab
	sodium citrate	68-04-02			1% - 5%	SECTION 12. Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise. The product itself and its products of degradation are	ScienceLab



Category	Chemical / Ingredient	CAS-No.	Description	Case	Dilution / Content	Comments	SDS/MSDS Source
	Aqn Solid Clearly Soft		softener		0.003% - 0.006%	SECTION 12. Toxic to aquatic life. SECTION 6. Do not allow contact with soil, surface water or ground water. Harmful to aquatic life. The product should not be allowed to enter drains, water courses or the soil.	ECOLAB
	propan-2-ol (isopropyl alcohol)	67-63-0			1% - 5%	SECTION 2. This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200). SECTION 12. Do not empty into drains.	ThermoFisher
	siloxanes and silicones 3-[2-aminoethyl]amino] Me, hydroxy-terminated	75718-16-0			1% - 5%	SECTION 6. Avoid discharge into drains or watercourses or onto the ground. SECTION 12. Not regarded as dangerous for the environment.	Brunngard
	fragrance	proprietary			0.1% - 1%	no data	

Category	Chemical / Ingredient	CAS-No.	Description	Case	Dilution / Content	Comments	SDS/MSDS Source
Dishwashing	Smartpower Dishmachine Detergent		Detergent			SECTION 12. This product has no known ecotoxicological effects. SECTION 6. Do not allow contact with soil, surface or ground water. SECTION 13. Where possible, recycling is preferred to disposal or incineration. Diluted product can be flushed to sanitary sewer.	ECOLAB
	sodium carbonate	497-19-8			60% - 100%	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise. The products of degradation are less toxic than the product itself.	ScienceLab
	oxirane, methyl-, polymer with oxirane	9003-11-6			30% - 60%	SECTION 12. Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise. The product itself and its products of degradation are less toxic than the product itself.	Spectrum

Category	Chemical / Ingredient	CAS-No.	Description	Case	Dilution / Content	Comments	SDS/MSDS Source
	Smartpower Rinse Additive		Rinse			SECTION 6. Do not allow contact with soil, surface or ground water. SECTION 12. Toxic to aquatic life. SECTION 13. Do not contaminate ponds, waterways or ditches with chemical or used container.	ECOLAB
	oxirane, methyl-, polymer with oxirane	9003-11-6			30% - 60%	SECTION 12. Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise. The product itself and its products of degradation are less toxic than the product itself.	Spectrum
	urea	57-13-6			30% - 60%	SECTION 6. Do not contaminate water. Do not allow to enter drains, sewers or watercourses. The products are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills. SECTION 12. The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. The product may cause risk of hazardous effects to the environment. Can have a harmful or damaging effect on the environment.	Koch
	alcohols, c10 - 16, ethoxilated	68002-97-1			10% - 30%	SECTION 2. Harmful to aquatic life with long lasting effects. Avoid release into the environment. Dispose of contents/container to an approved waste disposal facility. SECTION 6. Do not flush into surface water or sanitary sewer system. SECTION 12. Harmful to aquatic life with long lasting effects. SECTION 13. Dispose of only in accordance with local, state and federal regulations.	SASOL



<u>Kitchen Speciality</u>	<u>Sani Wash N Walk</u>	<u>Floor Cleaner</u>				
	propylene glycol	57-55-6		5% - 10%	SECTION 6. Do not allow contact with soil, surface or ground water. SECTION 12. The product has no known ecotoxicological effects. SECTION 13. Do not contaminate ponds, waterways or ditches with chemical or used degradation products are not likely. However, long term degradation products may arise. The products of degradation are less toxic than the product itself.	ECOLAB ScienceLab
	boric acid	10043-35-3		1% - 5%	SECTION 6. Do not let product enter drains. SECTION 13. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.	CDH
	alcohols, c12-15, ethoxilated	68131-39-5		1% - 5%	section 6. Avoid release to the environment. SECTION 12. Toxic to aquatic life. Harmful to aquatic life with long term effects. SECTION 13. Dispose of contents/container in accordance with local/regional/national/international regulations.	Stepan
	N, N-bis(3aminopropyl)laurylamine	2372-82-9		2.06%	SECTION 6. Do not let product enter drains. SECTION 12. No data available. SECTION 13. Product may be burned in an incinerator equipped with afterburner and scrubber.	Toronto Research Chemicals
	boric acid (h3bo3), copd. With 2-eminoethanol (1:1)	68586-07-2		1% - 5%	SECTION 6. Avoid...contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). SECTION 12. Not available SECTION 13. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.	PPG
	d-glucopyranose, oligomeric, c10-16-alkyl glycosides	110615-47-9		1% - 5%	SECTION 6. Do not discharge into drains/surface waters/groundwater. SECTION 12. Acutely toxic for aquatic organisms.	BASF

<u>Other</u>	<u>CBC Plus Toilet Bowl Cleaner (Oasis 137)</u>	<u>Toilet Bowl</u>				
	phosphoric acid	7664-38-2		5% - 10%	section 6. Avoid contact of spilled material and runoff with soil and surface waterways. SECTION 12. No known significant effects or critical hazards. SECTION 13. Avoid disposal. Prevent from reaching drains, sewers or waterways.	ECOLAB Fisher Scientific
	n-alkyl (60% C14, 30%% C16, 5% C12,5% C18) dimethyl benzyl ammonium chlorides	53516-76-0		1% - 5%	<u>Quaternary ammonium compound</u>	IXOM
	n-alkyl (68% C12, 32% C14)dimethyl ethylebenzyl ammonium chlorides	85409-23-0		1% - 5%	<u>Quaternary ammonium compound</u>	Claire

<u>Category</u>	<u>Chemical / Ingredient</u>	<u>CAS-No.</u>	<u>Description</u>	<u>Case</u>	<u>Dilution / Content</u>	<u>Comments</u>	<u>SDS/MSDS Source</u>
	<b>Lemoneze</b>		Shower walls, basins			SECTION 6. Do not allow contact with soil, surface or ground water. SECTION 12. Harmful to aquatic life. SECTION 13. The product should not be allowed to enter drains, water courses or	ECOLAB
	silica, crystalline - quartz	1408-60-7			30% to 60%		
	dodecylbenze sulfonic acid and its salt	27176-87-0			5% - 10%	SECTION 12. Ecotoxicity Toxic to aquatic life. Harmful to aquatic life with long lasting effects. SECTION 6. Environmental precautions Avoid release to the environment...Avoid discharge into drains, water courses or onto the ground.	ThermoFisher
	alcohol ethoxylate	68439-46-3	surfactant		5% - 10%	SECTION 12. Ecotoxicity Toxic to aquatic life. Harmful to aquatic life with long lasting effects. SECTION 6. Environmental precautions Avoid release to the environment... Avoid discharge into drains, water courses or onto the ground.	Stepan

For more information, please visit [www.sciencofast.com](http://www.sciencofast.com) or to view the Marine Sanitation Devices (MSDs) Presentation: <https://www.slideshare.net/biomicrobics/sciencofast-marine-sanitation-devices-msds-presentation>

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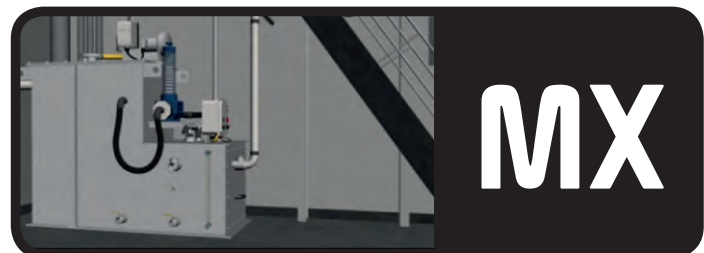
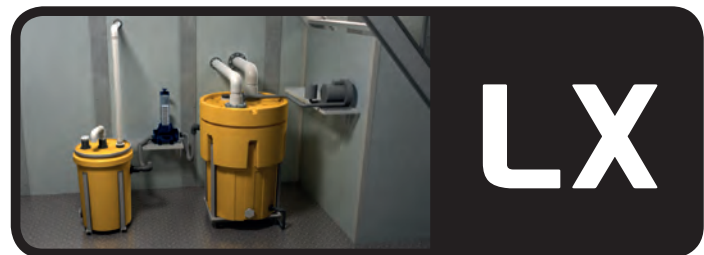
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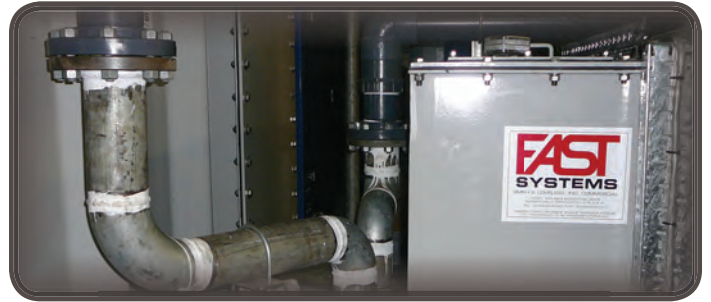
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# “Getting Your Maritime Connectivity Strategy Right”

Ship operation is being reinvented, and it's an evolution with the online revolution and digital connections at its core. The challenges of satisfying and balancing the many connectivity demands of the ship, its operators and its crew, are often far from clear and pack a hidden punch. Such needs include those of the master and officers requiring easy, uninterrupted contact with colleagues, harbor officials, administrators and regulators on shore, and to carry out competitively critical tasks such as least cost routing. Then there are the seafarers who have come to expect daily connectivity with family and friends ashore (access to the Internet has been classed as a human right by the United Nations) and the availability of social media, movies, news, and sports programs they consider part of civilized life.

As a result, any effective maritime SATCOM strategy must serve several masters:

- Efficiency and profitability of operations,
- Operational and regulatory compliance,
- Effective manning and retention,
- Safety at sea, and
- The needs of an increasingly “digital native” crew.

Right off the bat, maritime managers must take into account the cost of any solution. Unlike the modest outlays needed for personal devices such as smartphones, laptops, tablets, and personal computers ashore, purchasing or leasing and then installing equipment on ships has traditionally been a major investment, to the tune of \$10,000 to \$80,000 per terminal based on size, capabilities and service. This is all before any monthly service bills.

Once the system is installed and at sea, for the sake of those on the bridge and elsewhere on the ship, as well as everyone and everything in the ship's environment, it is vital that the set-up works reliably without unexpected hardware, service, or network limitations or restrictions, while it supports the needs of diverse stakeholders onboard and ashore.

## Benefits and Applications of an Effective SATCOM Strategy

Successfully deploying such an end-to-end solution, based on an effective, well-planned strategy, offers a range of benefits to shoreside and shipboard operations, safety, and competitive positioning.

*Operations & Regulations:* On the bridge, the officers need to harness their electronic resources to ensure the ship complies with constantly evolving regulations on such key matters as emissions reduction (involving the switch to more expensive fuels in designated coastal regions, and back again for the open seas) and Safety of Life at Sea (SOLAS) requirements relating to electronic charts, maritime security alerts, and other vital matters.



Photo: courtesy of KVH

The newest satellite communications antenna system from KVH, the TracPhone V3-HTS is designed to deliver data speeds of 5Mbps/down and 2 Mbps/up, faster than systems much larger than the V3-HTS's 39 cm diameter.

In addition, there is what has until now been a stack of paperwork to comply with the Standards of Training, Certification and Watchkeeping (STCW) convention on the testing, education planning, and detailed reporting of each seafarer's individual training and competency records. Shifting to an e-training approach that takes advantage of digital content delivered by satellite and incorporating a training management system enables seafarers and administrators to stay up to date, comply with requirements to record and report training status, and access necessary records across the entire fleet.

In his preface to the Futureautics Crew Connectivity Survey 2018 Survey Report, Martin Kits van Heyningen, CEO of KVH Industries, Inc., observed, “The effect of the mindset shift regarding technology throughout the maritime industry appears to be well understood by seafarers: Some 69% view big data and analytics, for example, as an opportunity for their jobs in the next five years versus only 17% who



view it as a threat. Likewise, 75% of seafarers reported seeing predictive maintenance as an opportunity versus 15% seeing it as a threat. Some 68% of seafarers see automation as an opportunity versus 21% who see it as a threat, which illustrates the massive shift to connected data to inform real-time decision making. This is an extremely exciting time for the maritime industry, as digitalization begins to transform ship operations and open up many opportunities to keep this industry vital.”

**Manning and Recruiting:** Satellite communications can also play a vital role in addressing a 21st century headache for many sectors of the maritime industry: how to attract and retain a new generation of seafarers. These are the men and women who are considered “digital natives,” who might spend weeks at sea at a stretch, and who, because of generally improved quayside turnaround times, or new port regulations that prohibit shore leave, will have little free time to ‘connect’ from shore. Many of these relatively young men and women are highly educated and accustomed to constant contact with their families and friends through social media, apps, and the wide range of content available online. This plugged-in generation will quickly turn their backs on a career in the merchant marine unless their e-needs are served.

**Crew Welfare:** The Maritime Labour Convention has set new standards for the conditions under which seafarers live onboard, and includes calls for seafarers to have access to news and entertainment and affordable communications services. Connectivity is undeniably part of life at sea now, as the recent in the recent FutureNautics Crew Connectivity 2018 Survey illustrates. The average availability of Internet access is reported at 75%, a more than 30% increase since the last survey. Some 61% of seafarers report having Internet access “always or most of the time.” And only 2% report “never” having access. Seafarers today take an average of three devices onboard, with smartphones the most popular device, as well as laptops and even smart watches and fitness trackers. Indeed, staying connected is so important that 75% of seafarers say Internet access influences their decisions about where to work, a sentiment shared by officers and ratings alike. Interestingly, there was a significant increase in the degree to which it influenced their decision, with seafarers who said Internet access has a “strong or very strong influence on who they worked for” going from 78% in prior years to an impressive 92%. Nevertheless, the amount of data available to seafarers per month is a pittance compared to when on shore. This gross disparity of modern life onboard compared with the luxury of shore-based



Photo: courtesy of KVH

Providing news, entertainment, and sports content to seafarers is important for crew morale on ships; with KVH’s content delivery solution, called IP-MobileCast, seafarers onboard can view the content on many different devices.



work is untenable. What is a progressive shipping company faced with substantial costs for providing high levels of Internet access to do? To allow their employees to travel freely along what used to be called “the information super-highway” would saddle the ship managers with potentially onerous monthly expenses. However, not providing such support puts crewing and manning requirements at risk.

## Considerations for a Successful SATCOM Strategy

Shipowners are sometimes caught between a rock and a hard place: keen to tune in to the Internet age, but fearful of the potentially massive bills related to legacy connectivity solutions that were extremely expensive and offered slow data speeds. Stuck in the middle, ITC managers yearn for a customized service but are constrained to keep down costs. As a result, it then appears that they are thwarting the digital revolution that is sweeping through every other industry, but often they are doing their best to ensure that their company would not be hit by “bill shock,” the huge monthly airtime bills that can result from runaway data use and something that could quite likely cost them their jobs. This quandary prompted many ITC managers to tamp down on consumption by blocking websites and file types, putting in place transmission protocols, limiting access, and installing file optimization software to reduce the amount of data transmitted. This approach protects the network but at the expense of versatility and flexibility,

essentially walling off sections of the Internet from the officers and crew.

**Speed vs. Need:** Capacity is not speed – it is bandwidth used over time and has to be carefully managed. The promised speed refers to the total bandwidth delivered to the vessel and is divided among the number of users trying to access the network. This, it is said, means that individual vessels or users do not experience anything close to expected speeds. The catch is that the amount of capacity that can be used over the course of a month, even on a relatively slow connection, can be very large if the system is in constant use. In addition, the speed for “unlimited plans” is also being divided among all users, resulting in individual performance that can be dramatically lower than the performance users might expect. This is especially so in regard to streaming of rich formats such as video and audio conferencing, Skype, social media and other applications, which gobble up bandwidth and are likely to be blocked or curtailed. Glued to the screen, crew members used to wide open connections onshore fail to recognize that they are bringing down the network because “fair use” thresholds in the contract with the service provider will trigger the brakes. These very activities are of course the most popular services for younger seafarers. They complain, and the next thing is that the ITC manager escalates the issue to the service provider, which insists it is keeping to the service contract.

The fair use policies are often contained in “fine print” clauses and state that service will be delivered at the promised rate until certain



Photo: courtesy of KVH

To enhance safety and meet regulations for maritime training, many ship operators turn to Videotel Performance Manager, a combination of award-winning content, an advanced software platform, and analytics.



# UNLIMITED DATA & BLAZING FAST

Delivered by KVH's TracPhone® V7HTS



Advanced,  
next-generation  
HTS network



+



Unlimited use data channel *plus* a  
high-speed data channel with 10/3 Mbps (down/up)\*



Expanded global  
coverage



Easy to  
upgrade



Affordable hybrid  
airtime plans



Because connections matter:  
[KVH.com/connections](http://KVH.com/connections)

For smaller vessels,  
the TracPhone V7HTS is now  
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thresholds are reached, at which point the service may be slowed deliberately to limit consumption. Deadlock. A clampdown on usage by the crew saps morale, and all, except perhaps the vendor, live unhappily ever after. The ITC manager, who had initially won kudos for securing the cheapest, fixed price deal, now has to answer for supposedly letting his employer down by failing to ensure a high-quality service.

The shipowner or manager must be careful in weighing the promise versus the performance of a “fixed rate” service solution. It might be hard to secure redress for the overall poor quality if service is acceptable for even just 1 hour in 24. In any case, just how does one measure performance?

The goal has to be that of attaining quality of connectivity independent

of the size of the monthly airtime contract and with transparent pricing. It has to be accepted that there will be a need to download large files including chart databases and manuals for operational and training reasons; and commercially licensed content, including TV shows, news, sporting events, movies, and music.

Making the decision that supports a particular fleet requires the time and effort to assess critical needs, expectations for growth, and what factors will offer the greatest competitive advantage in an increasingly competitive industry. Taking these into account will help ship operators overcome the challenges and get their “connected” strategy right. See the KVH White Paper, “Getting Your Maritime Connectivity Strategy Right,” for a guide to selecting a connectivity solution that is right for every ship.

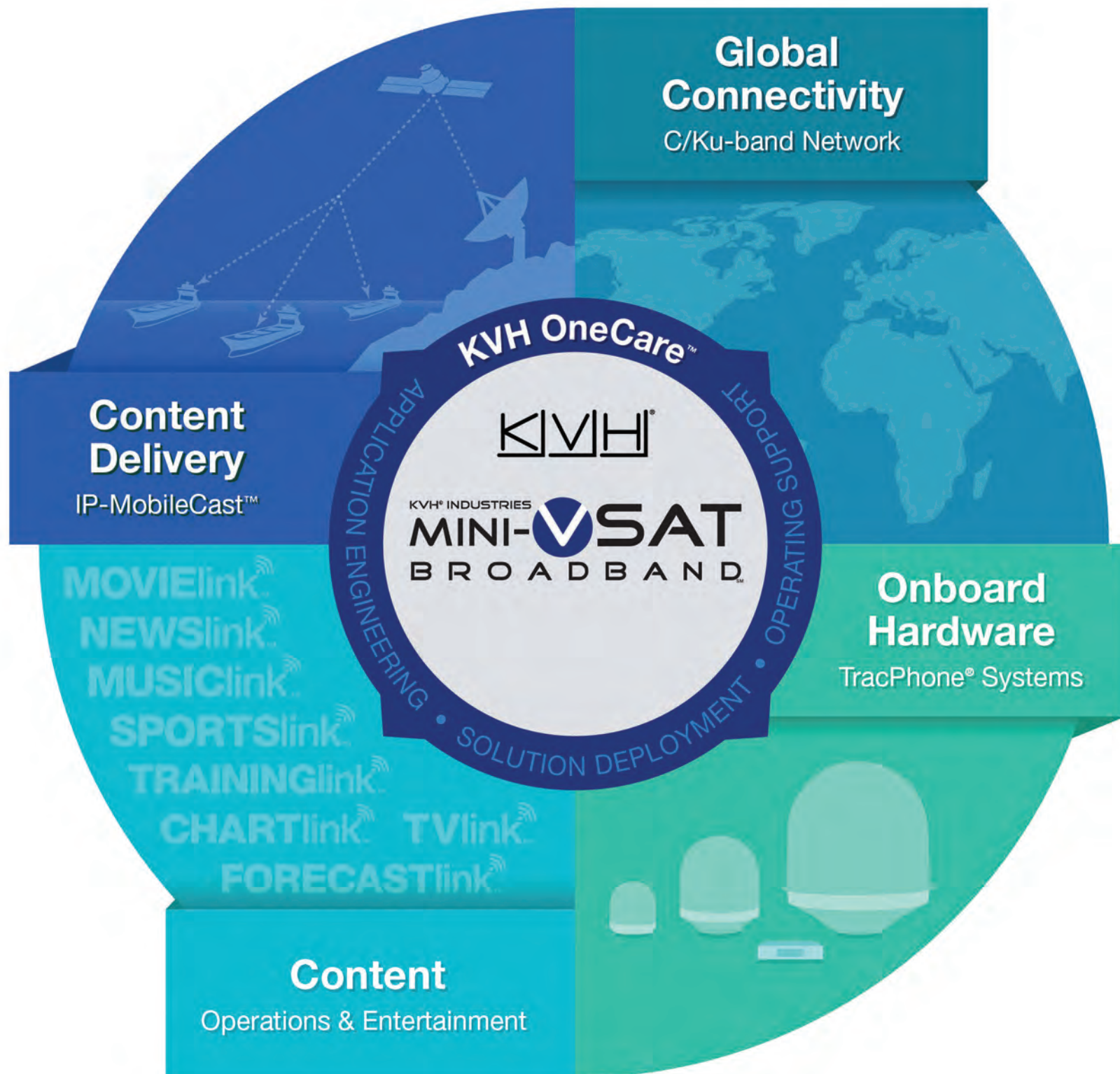


Photo: courtesy of KVH

Unique in the maritime industry, KVH’s end-to-end solution for connectivity includes TracPhone antenna hardware, mini-VSAT Broadband airtime, news and entertainment content, and IP-MobileCast content delivery.



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## Marine Jobs Made Easier with Viega Fittings

**A**lthough a 150-foot yacht is big, the spaces inside to do repair or replacement work are still very small. That's exactly why the crew at Engineered Yacht Solutions in Fort Lauderdale, Florida, used Viega for a recent pleasure motor yacht job, as well as many others.

EYS worked on a yacht, around 150 feet in length, removing all the aluminum bilge suction lines and replacing them with Viega SeaPress instead. The ability to press fittings, and to do it quickly, meant the small crew doing the work was done with the Viega portion in just a few days.

"There were some sections of bilge suction piping that were compromised with holes in it and degraded material," said Aksel King, Vice President of EYS. "The vessel was probably 10 years old and the material we cut out was a 60-series grade aluminum, which is not the best for seawater or for the way they had constructed the boat. Viega SeaPress is a big upgrade for the vessel, a better material, and it made the job easier to do too."

Because there was a tight timeframe to get the repairs done, coupled with the fact that cold press technology is safer particularly in tight



Photo: courtesy of Viega



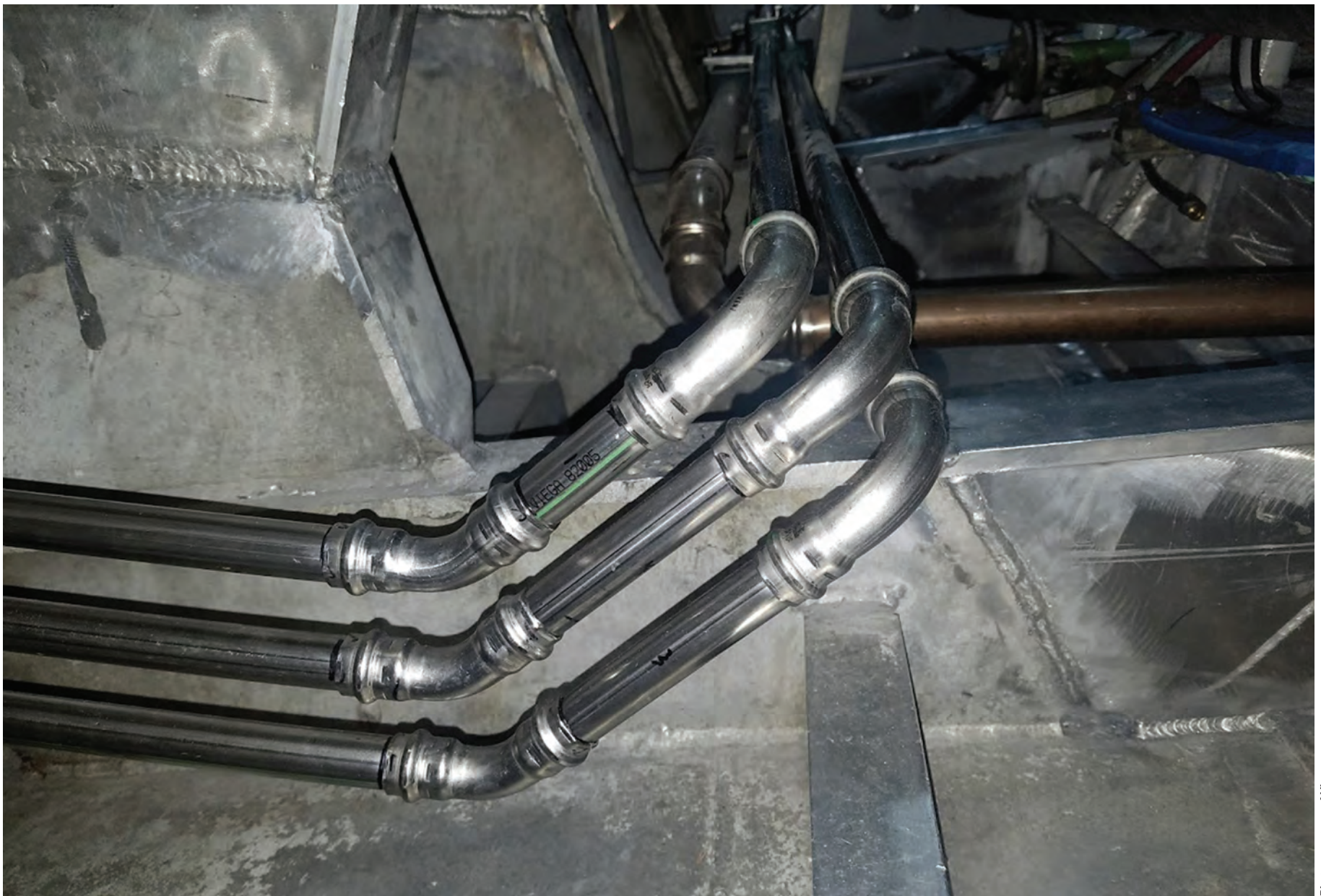


Photo: courtesy of Viega

quarters, EYS turned to Viega. Plus, King and EYS President Thomas McGowan have a history of using Viega fittings long before they started the company together three years ago.

“If I’m working on piping on a boat, I’m concerned about putting a bunch of welding equipment inside a million-dollar motor yacht!” King said. “When you start striking an arc, it’s fire. You’re going to have to have a fire watch and have a marine chemist come and make sure the area is safe to work in. I don’t have to worry about that with Viega.

“And at the end of the day, sometimes you don’t even have the ability to weld inside of a boat because of the other work going on, or time restraints and physical location. We just go in and cut and press.”

On the recent vessel, 54mm Viega SeaPress fittings were used for about 40 feet of pipe run. King said they used a variety of fittings, including tees and 45-degree elbows, and connected to the bilge suction manifold.

King and McGowan have been using Viega for about a decade. They were introduced to the company when the suppliers they had been working with for a local repair suggested Viega as an option. They started with Viega ProPress and later added Viega SeaPress to their repertoire. Much of the product they now install is Viega SeaPress or Viega ProPress Stainless 316, occasionally utilizing Viega ProPress Copper for chilled water.

With Viega’s recent launch of Viega MegaPress® CuNi, EYS now has

more options to choose from, depending on the vessel they’re working on. Both Viega MegaPress CuNi and Viega SeaPress are 90/10 copper nickel fittings, but Viega SeaPress is for CTS tube, while Viega MegaPress CuNi is for IPS pipe.

**Viega MegaPress CuNi**, a new copper nickel press fitting system designed specifically for applications on commercial ships, private yachts and offshore rigs, recently obtained a type approval from the American Bureau of Shipping (ABS) and an acceptance letter from the United States Coast Guard (USCG).

With the new approvals, Viega MegaPress CuNi products can be specified throughout an ABS-classed vessel for applications that include hydronic heating, compressed air, fire sprinkler, cooling water, low-pressure steam, fuel, lube and hydraulic oil.

Viega MegaPress CuNi is a 90/10 copper nickel press fitting system designed for use with Class 200 and schedule 40 copper nickel pipe. MegaPress CuNi has low biofouling properties and resists seawater corrosion to ensure reliable performance. Available in 304 and 316 stainless steel, Viega MegaPress Stainless is for connections with Iron Pipe Size (IPS) stainless steel and is approved for use with Schedule 5 to Schedule 40 pipe. MegaPress CuNi fittings are constructed from 90/10 copper nickel alloy and are available in a variety of configurations in sizes ½” to 2”. Patented Smart Connect® technology, available only from Viega, provides installers with added confidence in their ability to





Photo: courtesy of Viega

ensure the integrity of connections.

“MegaPress for copper nickel provides another solution for marine applications that doesn’t require welding and saves our customers a ton of time, which translates into other savings,” said Paul Switzer, manager, shipbuilding and offshore, at Viega. “Viega customers in the marine and offshore industries recognize and appreciate the other benefits of pressing as well, including flexibility, safety, the ability to work in small spaces and make repairs or replacements while on the water.”

Viega MegaPress XL<sup>®</sup>, the first and only press fitting system for 2 ½” to 4” diameter carbon steel pipe, also obtained a type approval from the American Bureau of Shipping (ABS) and an acceptance letter from the United States Coast Guard (USCG).

Viega MegaPress XL is approved for more applications than any other carbon steel press fitting system. On average, MegaPress XL makes easy, secure connections in 25 seconds. When used in marine applications, MegaPress XL is suitable with Schedule 10 through Schedule 80 carbon steel pipe.

All of Viega’s approved press fitting systems provide key benefits for marine and offshore applications by replacing traditional pipe joining methods like welding and threading. Shipbuilders are able to avoid excessive costs by eliminating hot work permits and fire watches. Connections can be made while the vessel is at sea, making it easier and more cost effective to perform permanent emergency repairs. Other



Photo: courtesy of Viega



**Rule the Sea**

**Introducing MegaPress® CuNi**



**MegaPress CuNi**  
PRESS FITTINGS

**MegaPress  
CuNi has  
NEW  
APPROVALS!**

**The most innovative, mechanically-attached fittings for the marine world.** Let's face it. With tighter deadlines, bigger budget constraints and a rising tide of labor scarcity, traditional welding methods have gotten in the way of timely building and repair. Finally, there's a faster, safer, simpler alternative that brings more certainty and success to the industry. MegaPress CuNi is a new press fitting system designed for copper nickel application aboard ships. It's a sea change for the marine world. Those who harness it will be those who rule with confidence. **MegaPress CuNi now has ABS Type Approval and is U.S. Coast Guard Accepted.**

**Viega. Connected in quality.**

Learn more about how MegaPress CuNi can help you rule the sea at [viega.us/RuleNow](http://viega.us/RuleNow)

**viega**



trades can also work around the pipe installations, effectively expediting the entire project.

Viega's press fitting systems are installed using a hand-held hydraulic tool that gives the installer the ability to press connections in seconds, which can reduce installation time by up to 90 percent when compared to welding and threading. Another significant advantage to using Viega press technology is the ability to make installation and repair connections both wet and dry.

"Being able to remove and reinstall pipe without having to do hot work, and 99-percent of the time in very tight quarters, is great," King said. "We use a lot of Viega stainless steel and copper nickel fittings."

Thankfully for EYS, many customers in Florida already know about Viega and its products, so they understand why it's a good choice for their vessels. EYS does almost anything that pertains to repair, modification or upgrading on vessels, including plumbing, fiberglass work, stainless steel work, pipe bending, lathing, grinding, polishing and more. Their average vessel is about 150 feet, though some are as large as 250 or 300 feet in size.

"I like Viega products. They're easy to use," King said. "In all reality, the best way to sell it is to say that it's simply the best option."

### **About Viega:**

*The Viega Group, with a tradition of innovation for nearly 120 years, has more than 4,000 employees worldwide and is among the leading manufacturers of pipe fitting installation technology. In metal press systems for industrial, commercial and residential projects, the company is the global market leader. In the U.S., Viega LLC employs more than 600 people and offers more than 3,000 products. These include Viega ProPress® for copper and stainless, Viega MegaPress® for carbon steel and stainless pipe, the Viega PureFlow® System including PEX and fittings in high-performance polymer and Zero Lead bronze, as well as MegaPress CuNi and SeaPress® systems for marine applications. Viega also specializes in the design, production and installation of ProRadiant heating and cooling systems, and offers Viega Flushing System Technology including carriers and flush plates.*

*For more information, visit [viega.us](http://viega.us).*



Photo: courtesy of Viega





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