

## **DREDGING INDUSTRY TRENDS**

Robert B Wetta<sup>1</sup>, Charles H. Johnson<sup>2</sup>

### **ABSTRACT**

This paper will explore current movements in the dredging industry. Details from a manufacturer's perspective will be presented to show recent developments in dredge designs, industry requirements and some of the challenges manufacturers face with industry demands. The authors will also research trends for dredging contractors and other dredging industry professionals to provide a general overview of the current dredging industry and recent movements and demands to meet project goals. The paper will also explore what might be on the horizon for the dredging industry as the authors speculate on future trends and industry requirements.

**Keywords:** technology, environmental, investing, equipment, contractors

### **INTRODUCTION**

We set out to seek information from industry sources to support our own beliefs on where the dredging industry is heading. We approached people that are classed in the dredging contractor industry but we tried to keep the focus group fairly broad in the type of work and services they provide. The following information was generated from three separate contacts as well as our own input on how we are trending. Our approach was simply to provide the abstract to each person and have them reply back with their thoughts. We will try to address all of the information obtained in categories as a lot of the feedback was common amongst all focus groups.

### **TECHNOLOGY**

We live in a world of technology where new products are being introduced every day. The dredging industry is by no means exempt from being touched by technology and perhaps this is one of the leading trends we are seeing in our industry. From a manufacturer's perspective, our industry continues to show a high interest in new technology and how it can play a positive role in cost reductions, increased efficiency and the gathering of information. New technologies are required to meet some of the trends of the way project conditions are changing. Dredging contractors are seeing more projects that have longer hauls for offshore hopper and clam dredge work. Projects utilizing cutter suction dredges are now seeing much longer pumping distances. There are tighter controls and monitoring at cutterhead, hopper and clam locations. There are tighter controls and monitoring on disposal activities. Dredges must be outfitted with as much technology as possible to aid in accuracy and positioning. Automation will continue to advance for all dredging operations.

Advances in technology do not come without their own set of challenges. The lever man of today requires a different set of skill sets than the lever man of yesterday. Keeping up with technology with PLC controls and positioning programs are essential to maintain uptime. One member of our focus group commented that technology is not necessarily an improvement. While most new technology has the potential to increase production of dredges, when the technology fails under real world conditions it can be a hindrance to an operation. Common failures can happen due to environmental conditions such as excessive heat, coldness, rain, snow or saltwater corrosion. The ability to continue dredging may be inhibited because a less seasoned dredge lever man can't run a dredge without the PLC or the dredge is not built to run without it.

---

<sup>1</sup> President and CEO, DSC Dredge, LLC 156 Airport Road, Reserve, LA 70084, Tel: 985-479-1355, Email: [rbwetta@dscdredge.com](mailto:rbwetta@dscdredge.com)

<sup>2</sup> Director of Sales, DSC Dredge, LLC 156 Airport Road, Reserve, LA 70084, Tel: 985-479-1355, Email: [chjohnson@dscdredge.com](mailto:chjohnson@dscdredge.com)

New technology must be relatively bullet proof for the benefits to outweigh the costs. When systems fail, there must be a support system in place to trouble shoot and repair the system as quickly as possible. Manufactures need to have fulltime process to support new technology. This is an added cost that the manufactures need to include in the costs of their equipment in order to support their clients. As we develop new technologies there is always some concern about competition and use of the state of art technology we have developed.

### **DIGGING DEEPER**

There are many factors that are currently affecting the dredging depth capability of existing dredging fleets. The Panama Canal expansion is challenging ports across the globe to deepen their draft capabilities in order to prepare for the post-Panamex ships. Environmental dredging contractors are also seeing a demand for increased dredging depths on projects. Mining companies are finding it increasingly difficult to permit additional land for exploration and this only leaves them with the option of going deeper to utilize the their reserves. Mining companies have also trended to taking efforts to research their deposits to find out the depths they can dredge to for saleable reserves. This research has also resulted in finding good reserves deeper in many deposits. A suction dredge with a 61 m (200') dredging capability is illustrated in Figure 1.



**Figure 1. Sand mining dredge.**

*(Source: DSC Dredge, LLC)*

### **INVESTING FOR ANTICIPATED DEMAND**

A new yet common theme for some United States dredging contractors is investing in new equipment. Great Lakes Dredge & Dock is currently investing in a new 11,468 m<sup>3</sup> (15,000 yd<sup>3</sup>) ATB trailing suction hopper barge that will be powered by a 10,440 kW (14,000 hp) tug. This new investment will be largest hopper dredge in the United States and is illustrated in Figure 2. In 2012, Weeks Marine christened the cutter suction dredge CR McCaskill and they are currently building a new 6,500 m<sup>3</sup> (8,500 yd<sup>3</sup>) hopper dredge. The CR McCaskill is illustrated in Figure 3. Marinex Construction is building a new cutter suction dredge and a new clamshell dredge. Cashman Dredging added a new clamshell dredge with a 46 m<sup>3</sup> (60 yd<sup>3</sup>) environmental bucket illustrated in Figure 4. Dutra Dredging has entered the hopper market with the dredge Stuyvesant and many smaller and medium sized contractors are upgrading their fleets. These investments certainly provide an optimistic outlook for the dredging industry but also allow for more competition in anticipation for a stronger market. A concern for the dredge contractors is that they are building for an anticipated but not yet realized demand. All of these new buildings without a guaranteed market can be risky but

we are now starting to talk about dredging at many levels. Ports will continue to be deepened but widening is not assured. There is a national commitment to coastal protection but projects are very slow to move. Funding for maintenance dredging is improving but is still not adequate. But one thing is for sure; we seem to have a resurgence of focus on our maritime infrastructure investment and we are all hopeful for a strong future. The President is even talking about dredging and visiting with our industry folds. This trending is pointing towards a strong future for the dredging industry.



**Figure 2. GLDD ATB hopper dredge.**

(Source: <http://www.businesswire.com/cgi-bin/mmg.cgi?eid=50365578&lang=en>)



**Figure 3. Dredge CR McCaskill.**

(Source: <https://tugster.wordpress.com/2013/08/05/specialized-19/>)



**Figure 4. Cashman clamshell dredge.**  
(Source: <http://www.norwalkcove.com/?p=2142>)

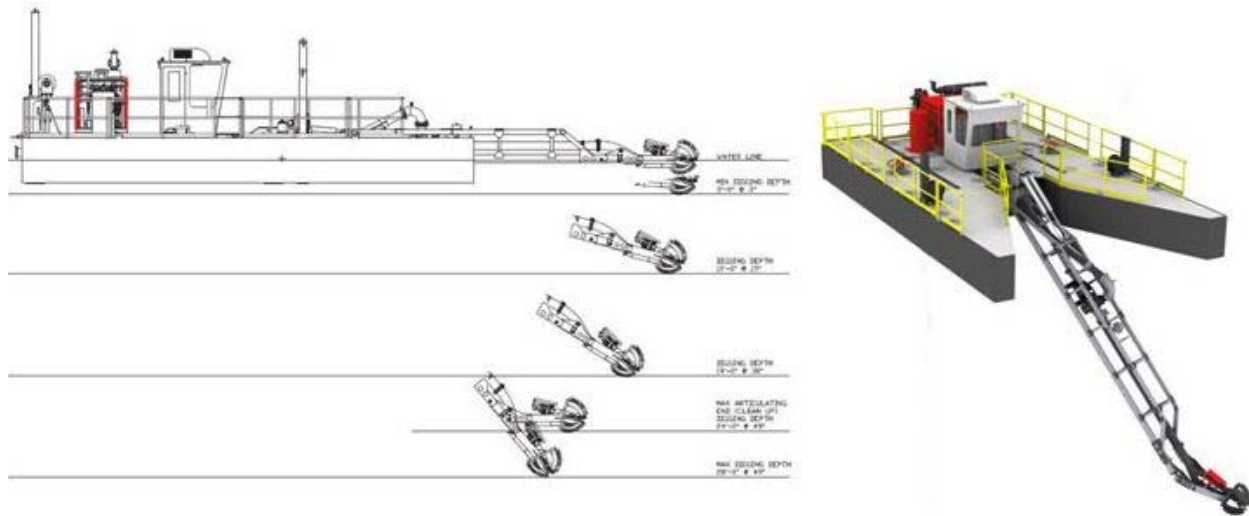
### **ENVIRONMENTAL DREDGING TRENDS**

The environmental dredging market has grown faster than any other dredging market. There has been little difference depending on a company's size; they are all seeking entry or growth into the environmental market. It doesn't matter if you are a small or a big company when involved with environmental dredging projects and needing to be aware the challenges in working in sensitive environments. All environmental dredging contractors need to be aware of the way the markets are trending and how advancements in equipment capabilities is something you better be investing in. Specialized dredge designs are being incorporated to minimize over-dredging in order to decrease the amount of dredged material that needs to be treated. Ladder articulation is an example of this surgical style of dredging and is demonstrated in Figure 5. Dredging equipment will continually be developed and modified for capping and backfilling the dredged areas. Advancements in excavation devices will continue to be challenged to increase production, increase accuracy and minimize re-suspension of the dredge material. Technology to automatically control cutter speeds to match dredge pump production rates already exists and may soon be seen as a required control feature on future projects. Since much of the work is in inhabited areas, contractors are required to focus on sound attenuation to reduce noise pollution. An example of a sound attenuated booster unit is illustrated in Figure 6. As new species get added to the endangered species list we will see continual changes in dredging windows, restricted areas and monitoring. The dredging industry is promoting additional attention to be placed on science. If we can spend as much time on the science as we do on the dredging then we should expect continued improvement for the industry as a whole. If engineers can understand the facts behind environmental concerns, perhaps we can develop equipment and/or methods that can resolve the concerns while accomplishing our dredging missions.

In regards to pumping distances the trend is there is not much different than navigational, maintenance or coastal dredging projects. Environmental dredging projects are also seeing increases in discharge distances. This trend is being caused by dredging widespread areas of contamination, having very remote processing stations and to avoid processing in highly populated areas. It's not uncommon to have discharge distances exceed a couple of kilometers for environmental dredging projects. This not only affects the dredging portion of the projects but can also have a bearing on the capping requirements. The further away you dredge could potentially require capping and transport back to the dredged locations. Portability of the equipment is must since many remediation sites are in remote or highly industrialized areas. The industry will continue to be challenged to beneficially reuse dredged material. This will increase the emphasis on dredging contractors to work with dewatering equipment.

Dredging equipment is also trending towards environmentally friendly design components. There has been a lot of recent developments in environmentally friendly lubricates. Equipment designs and component selections are being chosen because of their efficiency and reduction in energy consumption. Electrically powered equipment is

becoming increasingly popular as the industry is paying attention to emissions requirements and to lower operating costs.



**Figure 5. Ladder articulation.**  
(Source: DSC Dredge, LLC)



**Figure 6. Sound attenuated booster unit.**  
(Source: DSC Dredge, LLC)

## EFFICIENCY

From a manufacturer's perspective, increasing dredge efficiency is one way to lower operating costs. Efficiency can somewhat be tied to technology as product enhancements or new products can offer manufacturers a way to increase the performance of the equipment. In order to understand the effects of efficiency we must understand factors used in analyzing efficiency. When considering the various dredge models during a dredge purchase, remember that dredge manufacturers are reluctant to build dredges with longer ladders or hulls to increase dredging efficiency due to competition on similar models. Taking the time to analyze how these features improve dredging efficiency over the life of the dredge will save your company time and money, will make your dredging operations more productive, and will give your company the edge on your competition. The owners of dredging projects, our clients, are concerned about costs and need to know how they can help control the costs. Educating them on efficiency and how it can reduce the unit cost of dredging is one approach our industry can promote. Production will continually be

challenged in an effort to drive costs down and this will require advancements in products to increase dredge efficiency.

## **EDUCATION AND TRAINING**

A positive trend the authors have noted is the increasing demand for education and training. It is becoming very common for companies to provide training on their products through formalized training seminars and courses. Simulation training on dredging equipment and software is available through many service providers as well as hands on field services.

The dredging industry has recently shown interest in certifications for our industry. Unlike many other industries, dredging has not formally adopted course in professional development that allow for an industry certifications. Recent discussions on accreditations on dredge related matters are moving forward as the industry is looking for coursework on many different dredging fields in order to provide better knowledge of what we do as an industry as a whole. As we continue to develop our thoughts on how to achieve industry accreditation, we will be ensuring a future for our industry for better management practices, better knowledge of the all areas industry, minimize conflicts and continue to educate the world about what we really do. The good thing is that we are talking about dredging and people are listening. Figure 7 illustrates our current administration noting the importance of our industry.



### **Obama urges support to fix roads, dredge ports, create jobs**

President tries to move the agenda on to economic growth with speech in New Orleans

**Figure 7. Talking about dredging.**

(Source: <http://www.cbc.ca/news/world/obama-urges-support-to-fix-roads-dredge-ports-create-jobs-1.2419461>)

The dredging contractors are making a shift in how they educate their clients. Environmentalists are concerned about the impacts of dredging and contractors are helping them understand real impacts, not what's has been historically perceived. We are encouraging and seeing use of dredge sites as research sites. Why rely on guess work like numerical monitoring to determine impacts when the same amount of effort monitoring jobs sites physically will provide real answers. We are trending towards additional regulations that also add costs to the equipment we operate and the work we perform. Since we are also trending towards education, let's make it a point to educate our clients of the added costs associated with new regulations and quality requirements so they can properly budget for these costs that obviously need to be shared by all parties. If we don't get the point across about what it really costs to perform the work at the level required, then how can we expect appropriate budgeting for the work to be performed?

A few notable themes that we came across when doing our research for this paper were centered on education and training. Some contractors stated that they must allocate more time and money to training. Companies should be documenting the operating hours of their operators since many specifications require operators to have a minimum amount of years on the chosen dredge. Additional training of the hydrography staff and surveyors who can use data to troubleshoot the very complicated survey and automation equipment needed for dredging projects. Training for operators to make them conscious to flow restrictions as many environmental projects have limiting flow rates and are not open discharges. The requirements went on and on but they all focused on an industry in need of additional training and education. The authors believe this will continue to be a growing trend and we need to take advantage of the opportunities to better our industry.

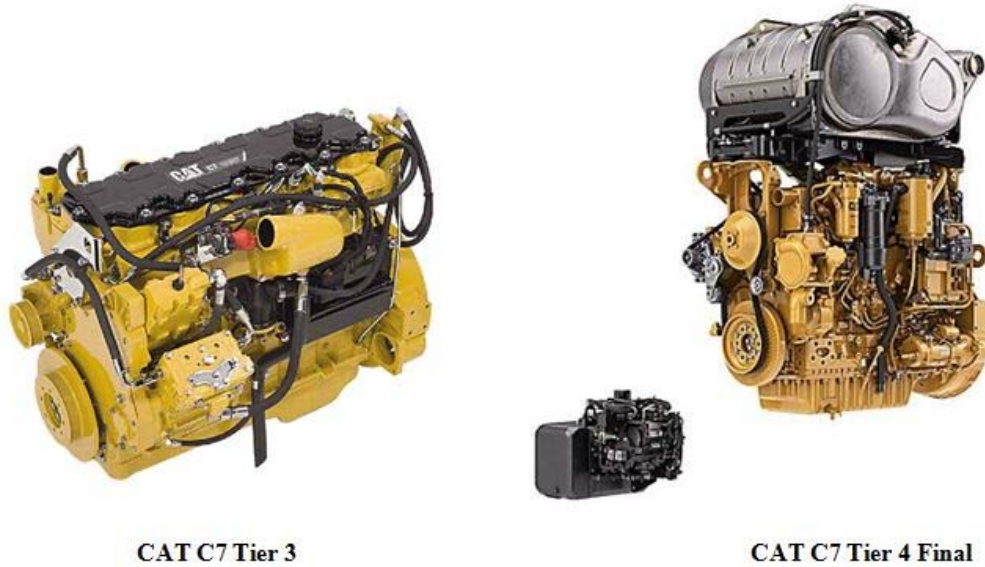
### **RISING SEA LEVELS**

Recently, much attention is being paid to global warming & rising sea levels. Estimates in the increase of sea levels vary between agencies from between 2 to 3 feet by the year 2100. Because of this, an anticipated trend is that project designers will focus more on addressing the issue of rising sea levels. As an example of this trend, on March 30, 2015, Norfolk, VA's Mayor Paul Fraim and other Norfolk city leaders signed a historic partnership agreement with Col. Paul Olsen, Commander of the US Army Corps of Engineer's Norfolk District. This agreement laid the groundwork for a project to protect Norfolk's northern shoreline, identified by the North Atlantic Comprehensive Study as being an area of high risk with regard to rising sea levels. In the USACE newsletter dated April 20, 2015, Col. Olsen was quoted as saying, "The sea-level fight starts here, right now, and I am proud to be a part of it". The initial 18.5 million project will address seven miles of Norfolk's coastline, with the entire project projected to span over a 50 year period.

### **SAFETY AND REGULATORY**

Safety has become an increasing popular and important aspect of our industry. It seems to be a shift for all industries and we are comfortable talking about safety at every opportunity. Operators and other employees need to have a full array of safety certifications since much of this work is for private industry where a bad safety record or insufficient safety training can keep a contractor from being able to bid work. Many companies have shifted to using third party service providers to rate their vendors on safety, quality and loss prevention. If you don't meet the minimum standards that the companies are looking for then you won't be able to do business with them. Specific industry focus can be found in organizations such as the Council for Dredging and Marine Construction Safety. Industry trade events have dedicated sessions on safety topics where participants devote their time to talk about a safety culture.

A big change that is now here is the Tier 4 emissions requirements regulated by the EPA. The USA industry will be required to be in full compliance in 2017. While the purpose of the regulations is beneficial in regards to emissions and the health of Earth, many challenges are just surfacing. Many diesel engines will have after treatment components added on so the overall dimensions of the engine could very possible change. When replacing an engine to a Tier 4 final engine don't be surprised if some pretty significant modifications are required to install the new engine. The costs of the Tier 4 final engines are averaging 150% of the lesser regulated engines many are operating today. Figure 8 provides an illustration of a Caterpillar C7 engine in Tier 3 and Tier 4 final configurations.



**Figure 8. Tier 4 engine changes.**

### CONCLUSIONS

In conclusion, we see the industry trending in a positive direction in many aspects. Technology will continue to offer new cost savings opportunities and offer new solutions to our challenges. Growth is expected to be good but competition is increasing with new entries into the market and the industry is becoming very entrepreneurial. It appears that future will require longer pumping distances and deeper dredging depths requiring new or upgraded equipment to meet these conditions. Customization of dredging equipment will be required for successful project completion. The requirement for dredging equipment more in line with the specific projects seems to be the future. Dredging equipment selections will need to be based on having the right equipment for the right project in order to offer best pricing and efficiency. We are seeing companies targeting niche industries and investing in custom equipment that gives them the an advantage to succeed in these industries. It is the authors' opinion that continued investment in new or modified equipment will continue to meet industry's demands. Areas of growth are projected to be in the environmental dredging markets and coastal restoration. Safety will continue to be at the forefront and regulatory requirements will continue to challenge the industry.

### REFERENCES

- Hanson, W.H. (2015). Personal communications, Great Lakes Dredge & Dock  
Buhr, V.J. (2015). Personal communications, J.F. Brennan Company, Inc.  
McDougal, D.S. (2015). Personal communications, Dredge America, Inc.  
Johnson, C.H. (2008). "Analyzing Dredging Efficiency and How Project Parameters and Dredge Design Affect Dredging Efficiency." *Proceedings of the Western Dredging Association (WEDA XXVIII) Technical Conference and Texas A&M University (TAMU 39) Dredging Seminar*, St. Louis, MO, June 9-11, 2008  
Sadowski, C. and Sjoblom, K.J. (2014). "Imagining Dredging." *Proceedings of the Western Dredging Association and Texas A&M University Center for Dredging Studies' Dredging Summit and Expo 2014*, Toronto Canada, June 15-18, 2014  
Bloodgood, Patrick (2015). Article, "Norfolk beach expansion combats sea-level rise" USACE Newsletter Engineer Update, April 20, 2015

### CITATION

- Wetta, R.B. and Johnson, C.H. "Dredging industry trends" *Proceedings of the Western Dredging Association and Texas A&M University Center for Dredging Studies' "Dredging Summit and Expo 2015"*, Houston, Texas, USA, June 22-25, 2015.