

# VALVE

MAGAZINE  
FALL 2020  
VOL. 32, NO. 4

## Market Outlook for 2021 **Planning Strategy for an Uncertain Future**

*PLUS: From Change  
Comes Innovation*



: SUBSEA  
: ACTUATION  
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: NEW TECH  
: FROM  
: MEMBERS  
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: IoT FOR  
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# 250,000

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- Pressure Seal valves, API 600 / SP-144 - WCB and Chrome.
- Dual Plate Check Valves, API 594, Wafer, Lug and Double Flange.
- High Performance Butterfly Valves, API 609, Wafer and Lug.
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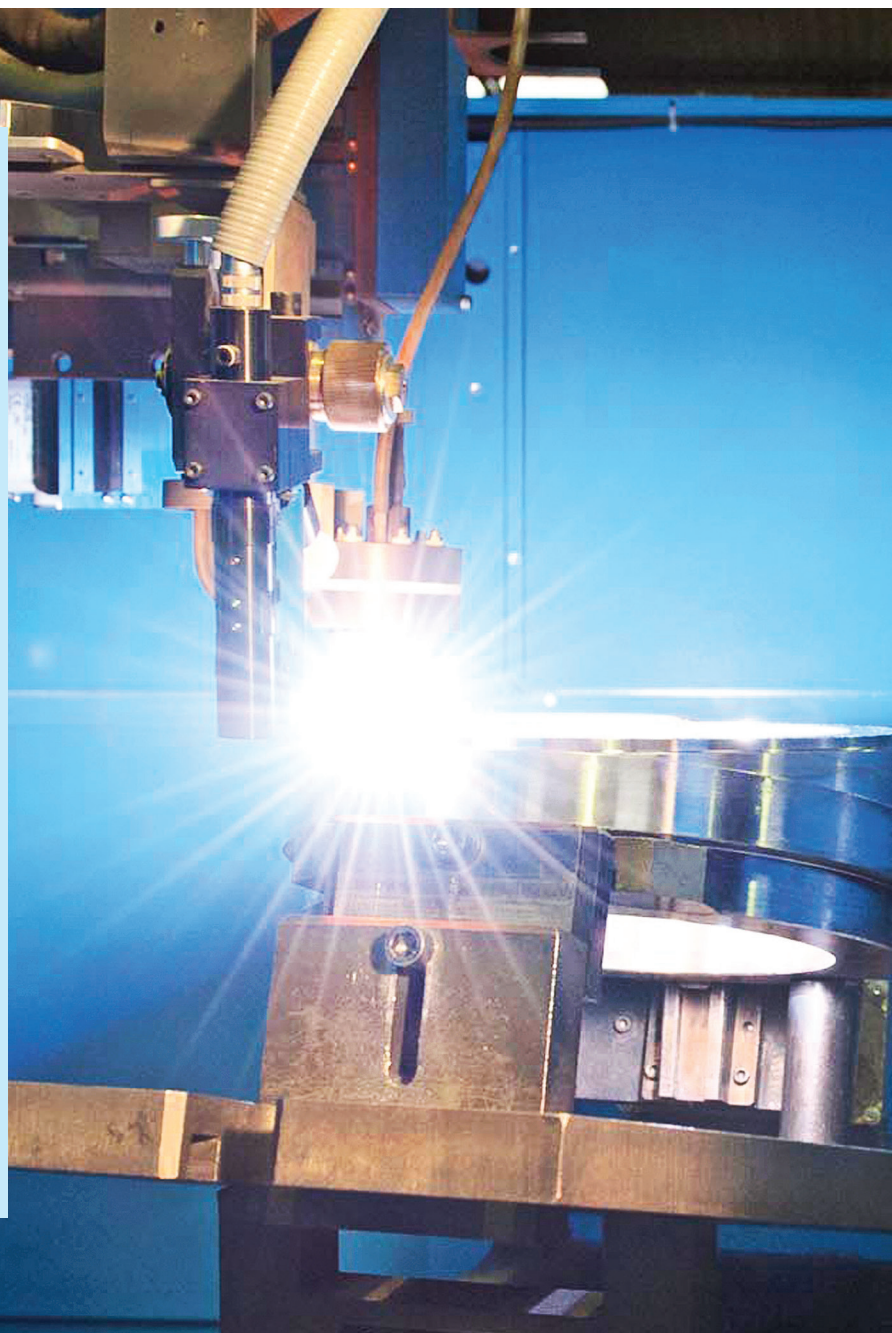
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**70**  
1950-2020

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13

# MARKET OUTLOOK 2021 UNCERTAINTIES CREATE STRATEGY CHALLENGES

At the time of the 2020 Virtual Market Outlook Workshop (August), the world and the industry were facing many concerns. However, the news on what's happening in some end-user markets was not all bad.

# VALVE

MAGAZINE

FALL 2020 | VOL. 32, NO. 4

22

## THE ACTUATORS THAT DRIVE SUBSEA OPERATIONS

The actuators that control valves under the sea face unique conditions. Different types are suited for different parts of the operation from exploration to production.

BY KARAN SOTOODEH

26

## HELPING CUSTOMERS COPE WITH TODAY'S CHALLENGES

From aging equipment in the nation's water systems to the increased needs for remote operations and social distancing, VMA member companies are creating new solutions to help their customers cope with the changing environment.

BY GENILEE PARENTE

## 40 Editor's Picks

PRODUCTS



- » Master Valve
- » Intelligent Actuator
- » Fieldbus Platform
- » Rotary Cone Valve
- » Clean Steam Generator
- » Solenoid Valves

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Some Up, Some Down**

## COLUMNS

### 4 Perspectives

Planning for the Disruptors

BY HEATHER RHODERICK

### 30 Industry 4.0

IoT for Supply Chains

BY STEPHEN CHERLET

### 34 Standards

ASME B16.34-2017

BY BARBARA DONOHUE

### 36 Education & Training

Practical Steps for Retaining Expertise

BY JOHN MOLLOY

## DEPARTMENTS

Industry Capsules ... 6

VMA Calendar ... 7

VMA and VRC  
Member Roster ... 38

Index to Advertisers ... 40

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# Planning for the Disruptors



**As we enter into our third season of the pandemic,** I'm struck as I read the articles in this issue how much COVID-19, perhaps the most unwelcome disruptor in recent memory, has created an accelerated adoption—or at least a fast acceptance—of technology and processes that had been talked about for a while but were being implemented very slowly, if at all.

For me, in order to continue to provide education, connections and value to our members and industry, the pandemic meant that VMA had to quickly pivot to virtual events. In its new virtual format, the popular Market Outlook Workshop delivered timely content on forecasts and analysis for various end-user markets and attracted its largest audience ever. If you missed the Workshop, highlights are found on page 13.

The VMA and VRC Annual Meeting, our premier members-only event for manufacturing, suppliers, distributors and repair companies, was also able to successfully provide insights on key issues facing industry leaders in a virtual format. In addition, we held our business meeting virtually, making it accessible for the first time ever to the full membership regardless of their location. Information on the meeting and VMA's new Board of Directors as well as other highlights can be found on page 10.

Throughout this issue you'll also see how the industry and our members are quickly making changes to new technologies that allow for increased customer service, remote monitoring, changes in manufacturing, and new ways to reach customers. I think you'll note as I did that while many of the terms like IIoT and video calls are not new, due to the pandemic they are quickly becoming much more commonplace.

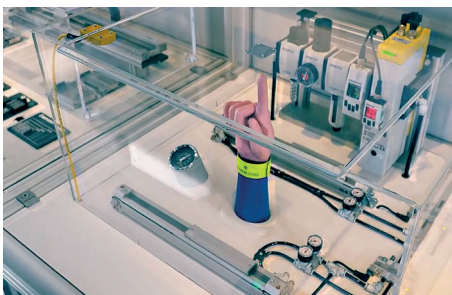
Disruptors certainly are not new, but if nothing else, the situation we find ourselves in has strongly reminded us of the need to always be looking ahead to keep aware of trends and ideas that may seem futuristic or improbable. Those that do this can react quickly and maintain business continuity when the disruptor comes—whatever and whenever that is. **VM**

**Heather Rhoderick, CAE**  
President





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## COLLABORATIONS & CONTRACTS

### Setpoint Expands Partnership with Ashcroft

Setpoint Integrated Solutions (Setpoint I.S.) and Ashcroft Inc. have expanded on the existing Authorized Stocking Distributor agreement to include three new Texas sales locations for Ashcroft Inc.'s line of pressure and temperature instruments.

Setpoint's existing territory includes the Texas "Golden Triangle" and East Texas. The expansion includes La Porte, Richwood and Corpus Christi. These distributing facilities service the Houston, San

Antonio, Austin and Corpus Christi areas.

The partnership between these two companies dates back more than 60 years.

### Emerson Announces Collaboration with MHPS

Emerson and Mitsubishi Hitachi Power Systems Americas (MHPS) have once again joined forces to develop digital technologies, software and services to help utility customers in North America. The companies will collaborate on digital solutions, enable predictive and AI-driven maintenance strategies and automate operational decision-making. The collaboration will focus on power plants operating with MHPS



□ Intermountain Power Plant

gas or steam turbines.

One of the companies' collaborations is to build and deploy total plant simulation for the Intermountain Power Plant Renewal project.

### Trillium Partnering with East Coast Valve Services

Trillium Flow Technologies

has named East Coast Valve Services an authorized assembler and distributor. East Coast will represent the SARASIN-RSBD safety relief valve brand for both new valve and repair business. Repair services for any manufacturer's brand of safety relief

## PEOPLE IN THE NEWS

**ITT...** announced that **Emmanuel Caprais** succeeded **Thomas Scalera** as CFO as part of the company's planned transition process. Caprais, who is currently Group CFO in charge of the Business Unit Finance teams, Financial Planning & Analysis, and Investor Relations, will assume the role of senior vice president and CFO.

Caprais joined ITT in 2012 as segment CFO for Motion Technologies and assumed the same role for the Industrial Process segment in 2017. He was named Group CFO in March of this year in addition to leading the financial planning & analysis and investor relations functions for ITT.

**PROMATION ENGINEERING...** introduced **Marcus Mahler** as its newest Western U.S. regional sales manager. Mahler will use his extensive industry knowledge to support regional customers in the western U.S. market.

Mahler has a comprehensive background in all phases of valve automation including assembly and troubleshooting.

**BADGER ALLOYS...** welcomed **Bret Kohler**, CSSBB, as its newest quality engineer. In this role he will investigate the systematic processes throughout the foundry, identifying opportunities for improvement, researching best practices and implementing solutions.

Kohler is an experienced industrial and mechanical engineer in various manufacturing settings who has focused his career on process improvement.

**TEADIT NORTH AMERICA...** promoted **Robbie Riggs** to the position of vice president of sales and marketing. Working closely with



Robbie Riggs

the regional sales managers and technical support team, Riggs will have responsibility for all market strategies and sales performance.

After gaining industry experience working in gasket distribution for 16 years, Riggs joined the Teadit team in 2018 and has served for two years as the director of national contracts and strategic market development.

**VELAN INC. ....** announced that **James Mannebach** has been appointed chairman of the board. The outgoing chairman, **Tom Velan**, will continue to serve as a director of the company. Mannebach, who joined the board in 2018, is the first independent chairman of the company. He has extensive experience in the valve and flow control industry having worked in senior leadership positions at Emerson Process Management (Xomox, Fisher Controls, Micro Motion and Rosemont), Roper Technologies and IML.

**Rob Velan** has been appointed vice chairman of the board as the Velan family continues to move from the second-generation leadership to third-generation and independent leadership. Rob Velan has served on the board since 2013 and is the executive vice president of MRO and Aftermarket, one of the company's strategic business units.

**Rejean Ostiguy**, CPA, is Velan's new CFO. He will be a key member of the company's senior management team and is succeeding John Ball, who has served in that role for 15 years. Ostiguy has an extensive career working in the finance departments of various industries, including Bombardier Recreational Products Inc. and more recently at Knowlton Development Corporation. He has held successive senior leadership roles with increasing responsibilities in finance.



valves will be provided by East Coast in its territories, which include Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New Jersey, Pennsylvania, the five Boroughs of New York City and parts of Maryland and cover all markets but nuclear power.

### Flowserve Is Rawson/Industrial Controls New Texas Distributor

Rawson/Industrial Controls, an ERIKS North America company, announced an agreement with Flowserve to offer its valves and actuation products throughout the state of Texas.

As a result of the agreement, Rawson/Industrial Controls' customers throughout that state now have access to Flowserve Limitorque electronic and pneumatic valve actuators, PMV valve positioners, Atomac lined valves, Durco valves, McCanna and Worcester Controls ball valves.

### ATI Actuators Supplying Terminal Expansion

ATI Actuators will aid in the expansion of Equistar Chemicals LP underground ethylene storage facility and terminal in Clemville, TX—the Markham Terminal. Construction is expected to begin by year's end.

The Markham Expansion Project scope includes the construction of equipment foundations, a control building and pipeline connections, and purchase and installation of dehydration and carbon dioxide removal, brine degassing, flaring, vapor control and monitoring equipment systems.

### Curtiss-Wright Signs Agreement with Ringo Valves

Curtiss-Wright partnered with Ringo Valves, a subsidiary of Samson AG Group, to provide the U.S. nuclear power market with control valves. Located in Zaragoza, Spain, Ringo Válvulas has designed and manufactured cast and forged valves for more than 30 years.

Ringo valves are used in a wide variety of applications such as refineries, chemical, petrochemical, oil & gas upstream, midstream and downstream, offshore, water treatment and energy generation plants.

### Flotech Stocking Henry Pratt Valves in the Carolinas

The Henry Pratt Company announced that Flotech is its new stocking distributor in both North and South Carolina. In addition to stocking Pratt (Milliken) valves in Florida, Flotech will add inventory in its existing Charleston, SC facility.

Flotech has the largest Pratt valve inventory in the U.S. Henry Pratt Company is a Mueller Water Products brand.

### MERGERS & ACQUISITIONS

#### Emerson Purchasing Open Systems International

Emerson will acquire Open Systems International, Inc. (OSI Inc.) for \$1.6 billion. OSI Inc. is an operations technology software provider. The acquisition is expected to close in early fiscal 2021 subject to various regulatory approvals and other closing conditions.

### Mueller Water Products Acquires Pratt Industrial

Mueller Water Products acquired Pratt Industrial of Emporia, KS. Pratt specializes in the design, engineering and worldwide distribution of technologically advanced, industrial-use valves and actuators. The company has more than 35,000 square feet of manufacturing and warehouse space, including a full-service machine shop for custom assemblies.

### AWARDS & MILESTONES

#### DeZURIK Awarded Dual Training Grant

DeZURIK received a Dual Training Pipeline grant of \$36,000 to provide tuition support for its machinists. DeZURIK employees will receive training and degrees through collaboration with the St. Cloud Technical and Community College for the 2020 school year. The Greater St. Cloud Development Corporation first introduced and assisted the DeZurik team with this grant opportunity in 2018. This is the third such grant DeZURIK has received.

#### Richards Industrials Wins NAM Leadership Award

The National Association of Manufacturers named Richards Industrials a winner of its 2020 Manufacturing Leadership Award. Richards Industrials has been recognized as the Manufacturing Leadership Council Editor's Choice Award winner for its shop floor innovations.

The awards are given to companies that have demonstrated excellence in digitizing their factories, connecting their organi-

### NOVEMBER 2020

**9-12**  
**Virtual Valve Forum + Basics**

**9-10**  
**Valve Basics Seminar: Valves 101**  
[VMA.org/ValveBasics](http://VMA.org/ValveBasics)

**10-12**  
**Valve Forum**  
[VMA.org/ValveForum](http://VMA.org/ValveForum)

### DECEMBER 2020

**1-3**  
**Valve World Conference & Exhibition**  
*Dusseldorf, Germany*  
[www.valveworldexpo.com](http://www.valveworldexpo.com)

**8-10**  
**POWERGEN International (Postponed)**  
[www.powergen.com](http://www.powergen.com)

### MARCH 2021

**30-April 1 (New Dates)**  
**POWERGEN International**  
*Orlando, FL*  
[www.powergen.com](http://www.powergen.com)

### MAY 2021

**3-6**  
**Offshore Technology Conference**  
*Houston*  
[www.2021.otcnet.org](http://www.2021.otcnet.org)

**COMING NEXT YEAR:**  
Visit [VMA.org](http://VMA.org) for the latest information on both virtual and live VMA events in 2021.  
[www.VMA.org](http://www.VMA.org)

\* Open to VMA/VRC members only. Visit [www.VMA.org](http://www.VMA.org) to learn if your company qualifies for membership.

# VALVE

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zations and transforming  
their business cultures to  
Manufacturing 4.0.

## DeZURIK Receives Safety Award

DeZURIK was recently  
recognized for excellence  
in workplace safety and  
health during the MN/SD  
Safety & Health Virtual  
Conference. The company  
received an Outstanding  
Achievement Award under  
the Governor's Safety  
Awards program, which  
is coordinated by the  
Minnesota Safety Council.

Applicants are judged  
on several years of injury  
data as it compares with  
their industry's national  
statistics, and on their  
progress in implementing  
a comprehensive safety  
program.

## Optimation Technology Receives 2020 Safety Award

Optimation Technology,  
Inc. is a recipient of the

2020 Safety Award of Merit  
from the Fabricators &  
Manufacturers Association,  
International. The annual  
awards recognize metal  
fabrication companies  
committed to excellence in  
safety.

The safety award is  
presented to companies  
posting an injury and ill-  
ness incidence rate for the  
calendar year 2019 that is  
better than the published  
Bureau of Labor Statistics  
rate by 10% or more, based  
on their North American  
Industry Classification  
System codes.

## NEW FACILITIES

### Neles' New Tech Center in China in Operation

Neles' new valve  
technology center in  
Jiaxing, China, has begun  
operations. The new  
plant strengthens Neles'  
valve and related product

production capabilities and  
increases availability for  
customers across various  
process industries in China  
and globally.

The new plant will  
produce over 100,000  
valves per year. Neles  
has valve technology or  
production centers around  
the world in North America,  
Germany, Finland, South  
Korea, Saudi Arabia and  
India.

## Flowserve Opens Certified Service Center in Egypt

Flowserve celebrated  
the grand opening of  
its new Certified Service  
Center (CSC) in Egypt.  
Through a partnership  
with Valves Engineering  
Co. in Badr City, the CSC  
will provide support to  
customers, including time-  
sensitive parts or repairs,  
reliability-based upgrades  
and in-depth engineering  
analysis.



## Introducing the VMA Valve Careers Center!

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## ATTENTION EMPLOYERS!

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help you reach a large and targeted group of job candidates.

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- ▶ Expedite real-time ads to help you get critical positions filled
- ▶ Develop strategic recruitment campaigns to place your employment brand in front of our elite talent pool
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- ▶ Access to more than 10,000 resumes

VMA is part of the ESCN (Engineering & Science Career Network), an alliance of niche association job boards built exclusively for professionals working within engineering and science industries. For job seekers and employers alike, the ESCN provides an effective online recruitment method to access the best quality jobs and candidates.

The VMA Career Center is an authorized VMA product, developed by Naylor Association Services.

**VALVE CAREERS.VMA.ORG**

# Virtual Valve Forum and Basics Take Place Nov. 9-12

One advantage of virtual meetings is that they can bring together participants from many locations and present scheduling opportunities that add value to attendance. Such is the case this fall when the VMA/VRC Valve Forum and Valve Basics 101 are held concurrently the week of Nov. 9 to 12. Basics is Nov. 9-10 and the forum is Nov. 10-12.

That means that for the first time, one registration includes access to the content for both events. Even though attendees and speakers will come from all over the world, they will meet virtually through one website. Attendees not only hear and see speakers, but can ask questions in real-time, engage in private one-on-one conversations and participate in small group discussions.

The 2020 Virtual Valve Forum is designed to provide in-depth information on the entire valve, actuator and controls industry. It is offered to anyone in



the flow control industry including manufacturers, suppliers, distributors, end users, engineers and consultants and is the only comprehensive conference for all those in the valve industry and its supply chains.

Tracks cover technical issues, management and marketing, manufacturing and valve repair. Technical issues include topics on standards, flow and cavitation performance, severe service equipment, new and emerging technologies, new materials and more. Management and marketing covers topics such as social media use, online marketing for the cus-

tomers journey, hiring the right employees, cultural assumptions in the workplace and communication issues. Manufacturing this year will address cellular manufacturing, new developments in the manufacturing world, robotics and other issues.

Also taking place this week is a VMA basics event—Virtual Valves 101—which is two days of education on the major valve types: linear, check, quarter-turn and pressure relief as well as an overview of manual operators. The course explains which valves and actuators are used for what applications, how they work and what challenges

each type face. The virtual presentations also include videos that back up the concepts being discussed with demonstrations of how the products work.

The course is designed to provide a broad look at the industry for those recently graduating in a technical field and professionals who may be going into a new field or entering an industry that works with valves, actuators and controls. It is also designed as a refresher course for those who specify valves and related equipment, sell the equipment or manage the people who work with the equipment.

VMA has been offering the valve basics course for almost a dozen years and has put together a group of instructors with deep knowledge of the industry.

To learn more about the Valve Forum and Valve Basics 101, as well as to register, go to [vma.org/valveforum](http://vma.org/valveforum).

## Valve World Expo is Dec. 1-3

The 12th International Valve World Conference & Expo is scheduled for Dec. 1-3 at the Düsseldorf Fairgrounds and Exhibit Hall, Düsseldorf, Germany. The expo brings together people from all over the world who come to see the latest technology and innovations in the world of valves and hear presentations from end users to the industry and experts.

Attendees include users, manufacturers, developers,

service providers and retailers of valves and fittings. Many VMA members are exhibitors or sponsors at the event. In 2018, the last event, more than 11,000 people attended and almost 650 companies exhibited.

In addition to the huge exhibit spaces, the event includes plenary presentations, workshops, technical sessions and more on topics such as hydrogen, counterfeiting, supply chain management, maintenance and



much more.

To keep visitors safe, the organizers of the event have posted a list of what will be done to keep the halls hygienic (social distance marking, capacity limits, transparent partition walls, information signs,

cleaning practices, food to go) and what visitors must do to protect those around them (networking without physical contact, mask requirements, buying tickets online only).

For information, go to [www.valve-world.net](http://www.valve-world.net).



# Annual Meeting Provides Tools to “Visualize the Future”

Although the format for the 2020 VMA/VRC annual meeting was different, the fact the event was virtual allowed more attendees to participate than in previous years, with registration up 30% over 2019—and the enthusiasm was evident throughout the three-day event.

The meeting, which was Sept. 9 to 11, focused on “new ways to network, to learn and to visualize the future,” a theme that was carried through in several ways.

**Bryan Burns**, president and CEO of DeZURIK and outgoing VMA chairman, began the event by pointing out new innovations and solutions that have come about this year.

“While this year was certainly unexpected, it also highlighted what VMA can do for our member companies and the industry,” he said.

For example, the pandemic led to a movement to advocate that the industry is essential to the nation. The need for social distancing prompted new ways of meeting and education through virtual events and webinars. All the challenges of this year showed how vital the association is in getting members the resources they need to deal with daily business needs, including how to deal with the pandemic.

Burns said it also showed how important one of the key efforts of the board is right now: coming up with the new strategic plan for the association. The board voted to create

the plan early in 2020, and it will be a major part of 2021’s efforts.

“VMA is the only association with the express purpose of helping our industry,” Burns said at the association business meeting. “The board believes this strategic plan can strengthen what’s already a strong association.”

**Arie Bregman**, vice president and general manager of DFT, who chaired the annual meeting program committee and took over as chairman of VMA after the event, agreed with Burns that the year has brought unprecedented change, but also new thinking.

“Certainly no business school ever addressed how to handle a pandemic, so we’re finding ourselves figuring out things as we go,” he said. However, technology allows us new ways to work, network and meet remotely. As far as the economic recession, “We’ve survived these downturns before. We will survive this one as well,” he said.

## RECOGNIZING VMA’S BEST

Just as it has in previous years, VMA honored individuals during this year’s meeting. Receiving the association’s highest honor, Person of the Year, was **Mark Nahorski**, president, IMI PBM.

Nahorski has accomplished much over the years on behalf of the association, including stepping in many times to lead projects. He has been on the Board of Directors for six years, serving as board



Mark Nahorski

chairman for one year, has served on the Nominating and Presidential Search committees and has been a willing source of industry guidance and assistance whenever it is needed. In announcing the award, VMA Chair Bryan Burns commented that, “Mark has always been willing to dedicate his time and expertise to better the VMA.”

After the event, Nahorski expressed his thoughts on receiving the association’s most prestigious award.

“VMA is successful due to the hard work and dedication of its staff and members,” he said. “I never thought that this achievement was within my reach, as I simply participated in doing what I love, while trying to make a difference in this great organization.”

Also honored at this year’s meeting was **Stephen Szpak**, director, Sales & Marketing, Trillium



Stephen Szpak

Valves USA, who received a VMA Service Award. Service awards are given to individuals who have gone above and beyond in supporting VMA, contributing to committee efforts and working with committees and staff to deliver value.

Szpak has been involved in VMA many years. For the last decade he also has been a vital part of the Market Trends Committee, serving as its chair the last three years.

After receiving the award, Szpak commented that, “It is my pleasure to work with such a professional and supportive team as the people at VMA. The knowledge and friendship that I have received over the years is my true reward.”

## NEW LEADERS FOR VMA

As part of the association business meeting, Bryan Burns announced the 2020/21 board slate. The following new and return-

**“Certainly no business school ever addressed how to handle a pandemic so we’re finding ourselves figuring out things as we go.”**

— Arie Bregman, DFT

ing leaders for VMA were subsequently elected by the membership. Serving on the Executive Committee are:

- **Board Chair: Arie Bregman**, vice president and general manager of DFT Inc.
- **Immediate Past Chair: Bryan Burns**, president and CEO of DeZURIK
- **Committee Members: Ron Warren**, president and COO, Bray International Inc.; **Matt Theil**, president, AUMA Actuators, Inc.; and **Nathan Brunell**, product line general manager, Baker Hughes.

Approved as new board members for a 3-year term are:

- **Alejandro Alcala**, senior vice president, Crane Co.
- **Mark Claffey**, president, Trillium Valves USA
- **Kevin McKown**, general manager, Curtiss-Wright Nuclear
- **Kevin J. Tinsley**, senior vice president, Global Operations, Neles
- **Kirk Wilson**, president, Flow Control Division, Flowserve

Returning board members are **Andrew Duffy**, ASCO L.P.; **Seth Guterman**, American; **Yves Leduc**, Velan; **Dave Loula**, ITT Engineered Valves; and **Brian Wright**, A-T Controls.

VMA expressed its deep gratitude to the following board members, who retired as of the annual meeting: **Pat Dunn**, Neles Valves USA; **John Ballun**, Val-Matic Valve and Manufacturing Corp.; and **Jim Walther**, KITZ Corporation of America.

## SPEAKERS AND QUESTIONS

Annual meeting attendees heard from several experts during the meeting who talked about topics key to the valve industry.

Keynote speaker **Lieutenant General Russel L. Honoré**, retired U.S. Army, kicked off the educational portion of the annual meeting by addressing leadership in the new normal. He pointed out that even though the pandemic has brought much uncertainty, doing routine tasks, but doing them right, can help companies get through the rough patches. "People don't like change," Honoré said, but "the primary responsibility of the leader is to lead and create change."

Speaking about unconscious bias, **Pamela Fuller**, global client partner for FranklinCovey, said that overcoming negative bias requires the courage to explore embedded preferences in ourselves and others. Biases are a reflection of what has formed us: our education and our life experiences. The first step in getting beyond bias is to uncover our own preferences and see how they affect our view of others, then learn to connect and learn who others are.

**Danielle Zaft**, organiza-

tional transformation and change management expert at JLL Americas, pointed out that aversion to change is largely a biological factor. Though it can be a complex process, organizations can effectively implement change by assessing the company's readiness then making plans compatible with the workplace culture, coaching individuals and teams through the process and putting in place supports to sustain the transformation.

**Michael Halloran**, CFA, senior research analyst, Robert W. Baird and Company, spoke about the current economic environment and what's to come.

Although the nation was already entering an industrial recession before the pandemic hit, "a lot has changed since last year" when he last spoke to VMA annual meeting attendees. Several factors have emerged including:

- Uncertainty is not going away. Companies now more than ever need to be able to manage through this uncertainty and have the nimbleness to adapt and the fortitude to invest to move forward.
- The last cycle for the economy, which was the longest cycle on record,

was a margin cycle. This one is a volume/growth cycle and he's still "relatively bullish at a high level" on volume and growth prospects going forward. Halloran said he expects to see more normalized environments by as early as the second quarter of 2021, though that could go as late as into 2022.

Speakers were available during Q&As following their sessions, with each speaker answering numerous questions.

## SHARING IN DISCUSSION FORUMS

The program also featured a series of group discussions interspersed with the formal presentations.

A Zoom gathering on marketing and selling in a remote environment attracted a lot of attention as members shared their experiences. One point brought up by several attendees was how to support their outside sales teams during this difficult year. Some members spoke about using the time freed up by lack of travel to implement sales training on how to effectively use digital technology to communicate with customers and prospects.

**Eric McClafferty**, senior partner, international trade at Kelley, Drye & Warren, led a discussion on legislative/regulatory developments, telling the group that tariffs will likely remain in place for a time, regardless of who is president. He noted that tariff exclusions for valve-related products have expired or are scheduled to expire at the end of the year.

CONSCIOUS BIAS	UNCONSCIOUS BIAS
EXPRESSED DIRECTLY	EXPRESSED INDIRECTLY
WE ARE AWARE OF THE BIAS	WE ARE NOT AWARE OF THE BIAS

Speakers at the annual meeting, such as Pamela Fuller, answered questions via the chat box during their presentations and then joined attendees for a live Q&A session.

CONTINUED ON PAGE 12

CONTINUED FROM PAGE 11

**FUTURE ASSOCIATION EVENTS**

Industry leaders also addressed what the future may look like.

**Heather Rhoderick**, VMA president said, "Our goals for the coming months and years will be to create the strategic plan that will lead our industry, our members and our

association to succeed and to address the challenges ahead—from the response to the pandemic, to whatever the next Administration brings, to continued changes in manufacturing operations, safety and other key areas."

"We're hoping we will be able to create a hybrid

solution that combines what we're learning through remote meetings with the face-to-face meetings we all enjoy."

At this year's concluding session, Bregman also commented that:

"My sincere hope is that COVID will be fully in our rearview mirror by

this time next year. We can look forward to an in-person meeting for the networking it provides," he said. The association will also be learning how to use the tools developed to deal with the pandemic to include more people as part of the association's programs. **VM**

## VMA Unveils New Career Center for Job Candidates and Employers

To help companies in the valve industry find potential job candidates and for job seekers to find the valve industry, the association has launched the Valve Manufacturers Association Career Center.

"One of the challenges in the valve and manufacturing world today is to find the skills needed to produce quality products. Positions and skills are being lost to retirement. Even in the environment we now find ourselves facing, companies have positions to fill," said Heather Rhoderick, CAE, VMA president.

"VMA provides some of the knowledge needed to help train and educate individuals about the benefits of working in the valve industry, as well on valves, actuators and other industry-specific information. The career center takes this

one step further by helping to connect job seekers with employees," she added.

Companies can post openings on the career center site at an introductory rate. Qualified valve industry companies that are members of VMA/VRC receive reduced rates. In addition, participating employers have access to search through thousands of resumes.

Professionals seeking a job can go to the career center site and enter search parameters such as type of position, education and experience requirements, category of involvement or just enter keywords to finetune their search. In addition, they can post their resumes at no cost.

Additional features are available for both job seekers and employers. The site is at [valvecareers.vma.org](http://valvecareers.vma.org). **VM**

## First Scholarship Award Winners Announced

Three up-and-coming stars in the engineering world recently were notified that they are the first recipients of the William Sandler Scholarship Awards. The scholarship program was created in honor of VMA's long-time president William Sandler, who retired last year after more than four decades with the association, half as its leader.

To qualify, a student must be enrolled in a two- or four-year course of study related to the field of engineering or manufacturing and have a parent who works for a VMA or VRC member company. The first three recipients, who will each receive \$1000, are:

- **Stephen Szpak**, Salem MA, who is studying chemical engineering at the University of Rhode Island, Kingston, RI. Szpak was nominated by his father, Stephen Szpak, Sr., who works for Trillium Valves USA.



On his application, the junior Szpak writes: "My goal is to stay within research, one day improving the quality of a product or someone's life. Being a chemical engineer is more about the impact rather than the paycheck."

- **Danielle Page**, Kings Mills, OH. Page is working towards an engineering degree from Vanderbilt University, Nashville, TN. She was nominated by her father, Charles Page of Richards Industrials, Inc.



She writes that: No matter which "specific type of engineering I choose, I hope to find a job with a company that treats employees, clients and the environment with respect."

- **Kyle Wong**, Yorba Linda, CA. Wong is a materials science & engineering student at the University of California, Berkeley. He was nominated by his mother Christine Wong, who is employed by Enertech, a division of Curtiss-Wright. Wong says his hope is to be able to study and work internationally and one day "address the water shortage in developing countries."



Find more information on the program and how to be nominated for future awards at [www.vma.org/SandlerScholar](http://www.vma.org/SandlerScholar). **VM**



# Market Outlook 2021

## Uncertainties Create Strategy Challenges



As the first virtual Market Outlook was occurring (Aug. 6 and 7), the world was in the grips of the Coronavirus pandemic and an economic recession that was just starting to ease up. Yet the well-received VMA/Hydraulics Institute event was not all doom and gloom. One of the main themes that speakers repeated was that it is just such times of challenge when innovation and new ideas are born.

Jay Bowman, managing director at FMI Corporation ([www.fminet.com](http://www.fminet.com)), who spoke to the group about commercial construction, may have framed it best.

In putting the chaotic situation in perspective, Bowman quoted the late Shell executive Pierre Wack who said:

"It is moments of uncertainty that hold the greatest entrepreneurial potential. It is precisely in these contexts—not in stable times—that the real opportunities lie to gain competitive advantage through strategy."

That thought was threaded throughout speakers' presentations as the experts and economists sought to give attendees their predictions on what the end-user markets may look like in the near and far future.

A few themes emerged including:

- Much discussion centered on the effects that this worldwide pandemic has had as far as speeding up the progress of technology. The world is using digital tools more freely at the same time companies are looking at the very real need to increase productivity, speakers pointed out.
- Don't look to China as the template for recovery. Although much hope occurred with China early on because the country "recovered" first, several presenters warned that China's economy does not look like the U.S. so we shouldn't use that country as an example of how recovery will occur here.
- Trade relations will continue to be troublesome no matter who wins the presidential election.
- Some trends from the pandemic will most likely stay in place after the current crisis passes such as supply chain rerouting and labor reallocations.



## Winners/Losers Gap May Widen

Before COVID-19, the discussion on the status of markets and the economy focused on how long the most extended economic cycle on record could last, what would happen as the nation exited that cycle and whether a good capital expenditure cycle was about to begin, according to Michael Halloran, senior research analyst. A lot has happened in a year, he said.

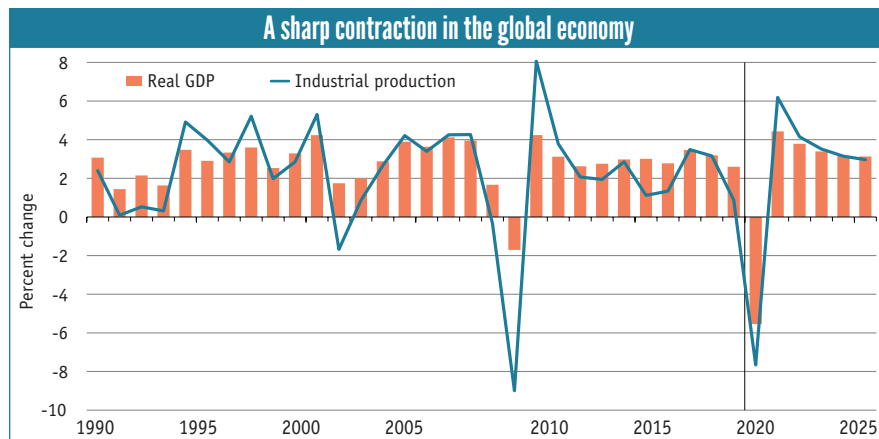
"The dynamics have changed, we've exited that cycle, we're in the midst of a recession and there's a whole lot to be worried about."

However, he told the audience to keep two realities in mind:

First, "uncertainty has always been" part of the markets, and while that uncertainty might be deeper at the moment, "it's incumbent to adjust and move forward," he said.

Second, "I think there's opportunity here once we can find a normalized pattern, maybe by late next year or 2022." By then, the country will have another growth cycle going again.

What the very sudden drop in 2020 means for some of the more capex intensive markets, such as water/wastewater and infrastructure projects, is that the next phase of growth may be longer in coming: two to five



years down the road.

In the short term, Halloran said he sees a major trend as more differentiation between winners and losers.

"We will see the spreads between multiples expand with greater performance on the winner's side and more average to below-average performance on the loser's side."

A few specific trends he predicted for end-user markets included:

- For engineering and construction projects, a positive backlog development suggests a better spending environment. Importantly, cancellations are not materializing as much as feared.
- For general industrial projects, short-cycle demand was already in recessionary territory before COVID-19. It has weakened further, but a return to growth is plausible by the first half of 2021.
- Offshore upstream activity and spending are unlikely to see significant improvement in 2020 unless oil prices can move materially higher.

- In later-cycle processes such as downstream oil and gas and chemicals, project activity and bidding has slowed dramatically from global uncertainties and while projects are being delayed, cancellations appear to be minimal so far.



## Gradual Recovery After Steep Declines

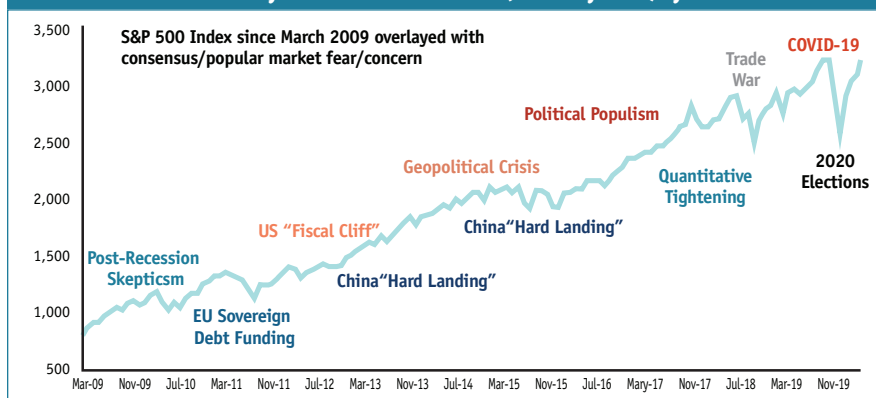
There is no doubt that COVID-19 is affecting every aspect of the global economy, and the recession "is unique in that it encompasses all developing as well as developed countries," Sara Johnson, executive director of Global Economics, told Market Outlook attendees.

She pointed out, however, that although the global real GDP has seen one of the sharpest declines in recent times—falling about 7.7% globally during the early part of the pandemic—that decline was milder than during the global financial crises of a decade ago.

There is no doubt, however, that "This very deep recession will be accompanied by the prolonged recovery period," she said.

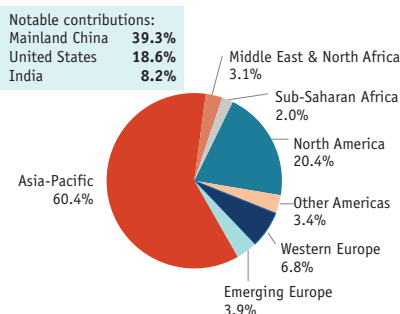
One sign of recovery is a strong rebound in industrial material prices. Those prices were at a high in 2011 with a somewhat steep decline in 2016, then a substantial drop

## Uncertainty has been a theme of this (and many other) cycles



## Asia-Pacific will account for more than 60% of global real GDP growth from 2019 to 2029

### Percent of world real GDP growth, 2019–29



Source: IHS Markit

towards the end of 2019 and during the pandemic. However, they rose 30% between April and the time of the workshop (August) driven by gains in markets such as chemicals, metals, shipping and lumber. Still, “we think the markets may have gotten ahead of themselves,” Johnson predicted, driven partly by the early recovery of China, which consumes about half of materials. Other factors driving prices right now are supply chain disruptions, the depreciation of the dollar and fiscal stimuli.

In the U.S., the recession emanated from the shock to consumer spending. However, all components of GDP will experience sharp declines for the year. She predicted a very strong rate of expansion (close to 20%) for the third quarter of 2020 subsiding to 3 to 5% growth rates into early 2021, but full employment in this nation won’t occur until 2022.

Like the U.S., Latin America’s countries were experiencing some of the world’s top rates of cumulative infections as of the workshop. The recession and weak commodity prices have hurt export earnings for much of South America, Johnson said.

Many of the countries in Western Europe will suffer double-digit declines in real GDP in 2020, and Johnson predicted the eurozone will take until later in 2023 to return to its GDP peak (in late 2019).

The area that will lead recovery from the global recession is Asia-Pacific, which will account for more than 60% of global real GDP growth over the next decade. Manufacturing hubs in Southeast Asia and South Asia may

gain market share as mainland China faces U.S. tariffs and rising labor costs.

How all the countries’ governments and central banks react plays an important role in the whole picture. However “we’re running out of ammunition,” as government budgets are weighed down, Johnson said

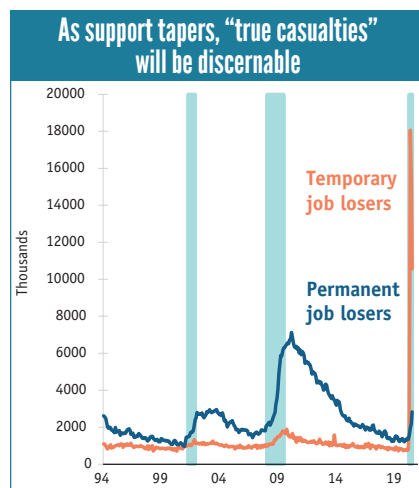
Johnson forecast a 5.5% decline in world GDP and a 6.1% decline in U.S. GDP. She also said the global economy will expand by 4.4% during 2021 and another 3.8% in 2022.



## Pandemic Has Lasting Effects

Like many of the Outlook presenters this year, Juhi Dhawan, senior managing director of Wellington Management, said recovery in this nation will be two-fold: a rapid rise that follows the dramatic drop, then a second, slow growth more typical of what happens during a recession. She went on to discuss what she sees as mid- and long-term effects of COVID-19.

For example, the housing market, which was a bright spot during the early woes of the economic fall, will continue to be a tailwind in this country for the next decade because “the growing millennial population is now



Source: Bureau of Labor Statistics, Deutsche Bundesbank, Ministry of Health, Labor and Welfare, Japan

at that juncture where homeownership rates rise,” she said.

Part of the reason the economic recovery will go from fast to slow is the employment situation.

“As the economy recovers, we see a tremendous loss in temporary jobs because as we open back up, retailers and restaurants are bringing back workers,” Dhawan said. But over the long haul, that loss will turn toward permanent jobs as businesses learn to right-size for the new realities and the government support to the unemployed goes away.

One trend occurring right now is that labor is being reallocated from companies very hard hit by the current situation (hospitals, leisure) to online service positions, which are increasingly popular.

“This type of dynamic was missing out after the great recession,” she said.

Also, during times when companies are finding it difficult to find the quality of labor at reasonable costs that they need, they typically spend more on capital expenditures or research and development, which leads to a willingness to spend on innovations. This, in turn, leads to an improvement in productivity.

She gave the health care industry as an example. In response to the pandemic, virtual visits have skyrocketed—climbing from about 18% of visits in 2015 to roughly half today.

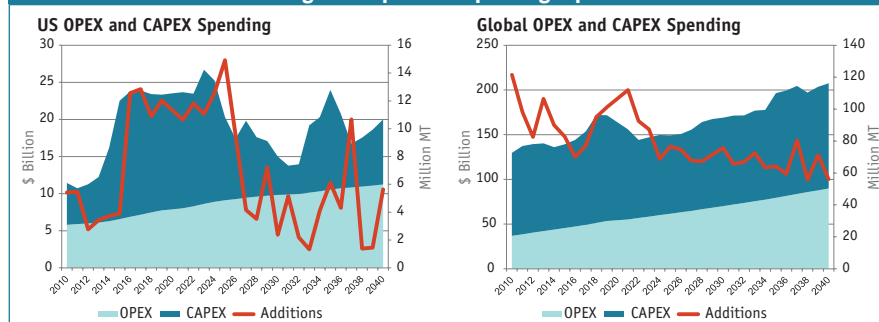
“Efficiencies such as these could make a big difference for companies facing challenges such as aging people [employees],” she said.



## A Pause During the Perfect Storm

The pandemic and the resulting oil price volatility has paused most capacity expansion in the chemical industry, according to Russell Heinen, executive director, consulting, IHS Markit.

## U.S. and global capital and operating expenditures



Source: IHS Markit

He predicted that what was happening would result in a loss of one to two years of demand growth in chemicals.

The industry is tied to what happens with oil, he explained. Over the last decade that has resulted in the rapid expansion of chemical industry capacity in the U.S. driven by shale field production. Though the current low oil prices are good for consumers gassing up their cars, they are not good for the chemical industry, which is why early 2020s drops in oil prices brought capacity increases to a temporary halt.

Still, the recovery in oil prices has allowed the U.S. to regain a part of its cost advantage, and Heinen expects the expansion to continue after the 2020 pause, including growth in exports.

In the longer term, one result of the rapid expansion of chemical capacity of the last decade is that supply has started to exceed demand; the country went from being an importer of chemicals to an exporter.

After the 2020s pause, spending on new chemical plants will continue growing. However, the volume of capacity added will decline over time because of economic and environmental pressures, Heinen said.

One of the economic pressures is operating expenditures (OPEX) versus capital expenditures (CAPEX). Currently, OPEX grows pretty steadily (see chart above), while capital expenditures (CAPEX) vary with economic and market conditions. A trend in the U.S. is that OPEX is currently catching up with CAPEX and will reach equality in the next few years. Because of this, Heinen said valve manufacturers might be advised to look at how much revenue might be gained by being involved in maintenance activity.



## What Goes Up

Although slowing occurred in the second half of 2020, the water and wastewater market showed solid growth for 2019, said Tom Decker, owner of Thomas E. Decker Consulting, LLC.

Decker originally predicted 4-6% growth for 2020, but that was before the coronavirus. Still, at the time of the workshop, the market had not yet slowed with wastewater construction put in place up 5.1% for the year and water construction up 21.1% (as of May). But that's affected by the reality that the market tends to lag the economy by 12 to 18 months because of long design and construction lead times.

Still, Decker said that as of the workshop some cancellations and postponements have occurred, but not many, and requests for proposals were

still coming out. Meanwhile, the presence of multiple, nine-figure major projects and programs in the U.S. with construction work just underway, design work just starting and funding just confirmed are a positive indicator for the market, Decker said.

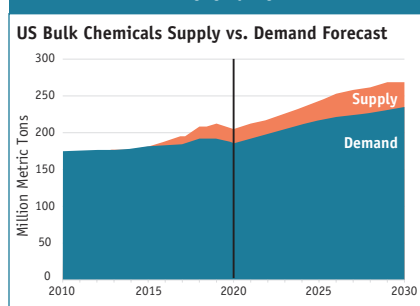
Market fundamentals remain strong for both the wastewater market, which is about 58% of the market and for water, which is about 42%. Part of the reason is that "World water demand more than doubled since 1960...and will continue at this pace or higher."

One development the industry has going for it right now is that the public is supportive. Surveys and studies found that most people are in favor of more investment and more than half are concerned about water scarcity. Voters in the city of Atlanta, for example, recently approved (by 71%) an addition to the sales tax that is specifically for water/wastewater improvements.

Water/wastewater infrastructure faces challenges and will need suppliers to help meet those challenges, Decker said. In the U.S., for example, non-revenue water (water that is produced but never makes it to the customer) amounts to 6 billion gallons per day from leaks and loss.

Many factors affect the finances for the industry. Water/sewer rates have been going up 5% per year; municipal bonds are strong and stable; and the Federal Reserve is buying bonds as an economic relief measure, Decker said. At the same time, utilities have declining revenues due to customers using less water—the national average use has gone from 120 gallons per person per day ten years ago to 80 today.

## U.S. chemical supply and demand over time



Source: IHS Markit

## Water/wastewater was on the climb going into 2020



Source: Thomas E. Decker





## Reliability (noun):

the ability to consistently deliver sustained performance, efficiency and durability in industrial flow control applications through proven mission-critical technology and services.



## Soft Markets into 2021

Although the oil and gas markets were seeing the initial levels of recovery that many other end-user markets were seeing at the time of the VMA workshop, John Spears, Spears & Associates, said full recovery is not likely to happen until well into 2021 or 2022.

"It is increasingly apparent the worst of the virus-related demand destruction has already taken place. However, before we can get back to the \$50 to \$60/barrel pre-pandemic levels, we have excess oil in inventory," to draw down, he said. Meanwhile, operators are cutting capital expenditures spending on the assumption that prices will remain low into next year.

Spears said global oil demand will be down 8.1% for 2020 before recovering in 2021 to rise about 7.5%.

Part of the reason demand dropped so drastically during the pandemic's earlier days was that about 40% of the global use of oil and gas comes from personal vehicle use; another 10% comes from ground transportation; 8% comes from ship movements and another 8% is the airline industry.

"Add that up and you get transportation accounting for 66%" of demand, he explained. While the lockdowns that caused the initial drops are easing, challenges remain on

the supply side. Spears said global oil production will be down 6.1% in 2020, then rise 4.3% in 2021.

Production numbers fall at a slower pace than demand and even though the U.S. and many other countries voluntarily shut in wells when the pandemic hit, more than a billion extra barrels of oil above the normal 3 billion the world keeps in inventory are now part of the picture.

All of this means less drilling, less pipeline and less need for pumps, valves and other equipment.

In the U.S., the gas industry has not been as affected at the same levels as oil mainly because not as much of it goes to transportation. However, warm winter weather has pushed gas storage about 30% higher in 2020 than the previous year, which will keep pressure on gas prices for the rest of 2020 and well into 2021.

Liquefied natural gas (LNG) exports have been hard hit all over the world by the drops in demand. In the U.S. more than 70 LNG cargo shipments were canceled just in July, Spears pointed out.



## The Industry's New Face

Like with most businesses, the power industry was feeling the disruptive effects of COVID-19 at the time of the Market Outlook. Lyle White, president at Sales Champions Consulting, estimated utility power usage dropped 8–18% during the pandemic. However, the changes in the industry over the last five years are also significant, especially in the U.S.

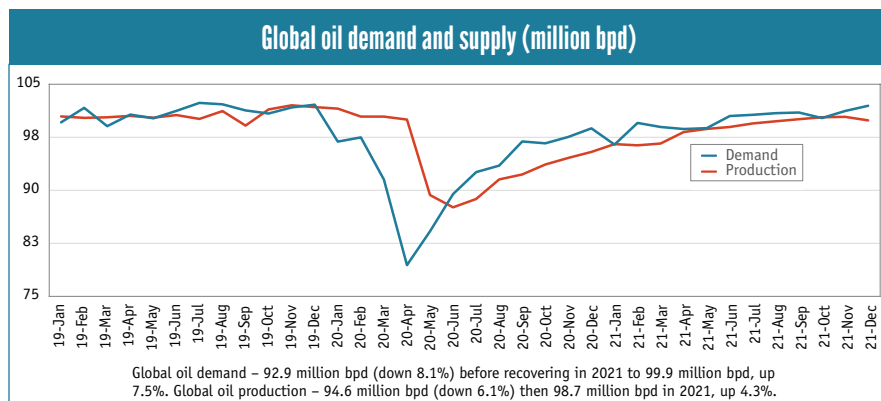
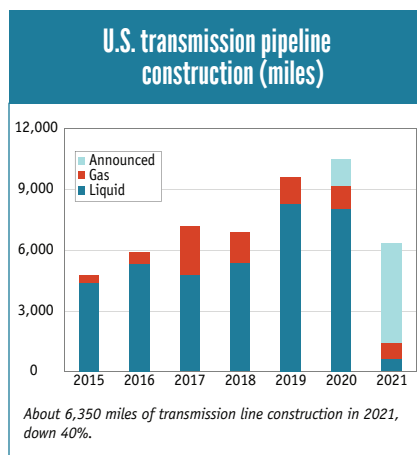
In the years leading up to the pandemic (2016 to 2020), the U.S. has gone from producing 44% of its electricity from coal to 24%. Meanwhile, the rest of the world has continued to depend heavily on coal, holding essentially steady (See charts, page 20.) U.S. natural gas generation rose from 22% to 38%, while the rest of the world's natural gas remained at 22%.

Hydroelectric generation stayed the same both in the U.S. and the world. In the U.S., two types of renewables gained ground: solar power crept up from 3% to 4% in the U.S., while wind went from 4% to 7%.

One worldwide trend is that electric vehicles are catching on with more than 5 million such vehicles now in use. Improvements in battery technology and the availability of charging stations have helped spur the growth.

New and growing technologies also will drive future changes, White said. Wind and solar require backup power for when the sun isn't shining and the wind isn't blowing; new quick-startup natural gas plants will likely take up the slack. Smart technology, such as smart grids, smart cities and smart buildings, will alter how consumers and organizations use power, and smaller nuclear reactors based on newer technology may become more prevalent.

White suggested a trend toward a resilient, sustainable and cost-effective distributed energy model,





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## U.S. and Global Power Generation—2016

### United States



- Natural Gas — 22%
- Coal — 44%
- Nuclear — 20%
- Hydro — 7%
- Wind — 4%
- Solar — 3%

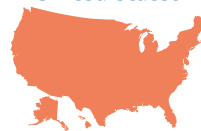
### The World



- Natural Gas — 22%
- Coal — 43%
- Nuclear — 11%
- Hydro — 16%
- Renewables — 4%
- Oil — 4%

## U.S. and Global Power Generation—2020

### United States



- **Natural Gas — 38%**
- **Coal — 24%**
- Nuclear — 20%
- Hydro — 7%
- **Wind — 7%**
- Solar — 4%

### The World



- Natural Gas — 22%
- Coal — 41%
- Nuclear — 11%
- Hydro — 16%
- **Renewables — 6%**
- Oil — 4%

■ = Significant change

Source: U.S. Energy Information Administration

coming from the developing technologies above, plus energy supplied from local storage and non-utility sources. Some effects will be:

- Power providers will have to follow market trends such as decentralized delivery of electric power.
- Renewables will be driven by climate change and governments. Demand is growing across the U.S., and solar will overtake wind to include half of the renewables demand by 2050.
- Consumer knowledge of electric power will be critical. For renew-

ables, one niche developing is battery technology for storing power.



## A Reimagined Future

The whole U.S. economy took a sudden hit from the coronavirus pan-

demic but construction may not feel the effects for some time, according to Jay Bowman, managing director at FMI Corporation. Historically, the U.S. construction industry lags the overall economy by 12 to 18 months, but it feels the effects for twice as long. That means that once the economy turns, the construction industry may not notice a big change for a year or more.

Bowman suggested preparing for different scenarios including whether the downturn is small and brief or profound and long-lasting.

He illustrated three possibilities

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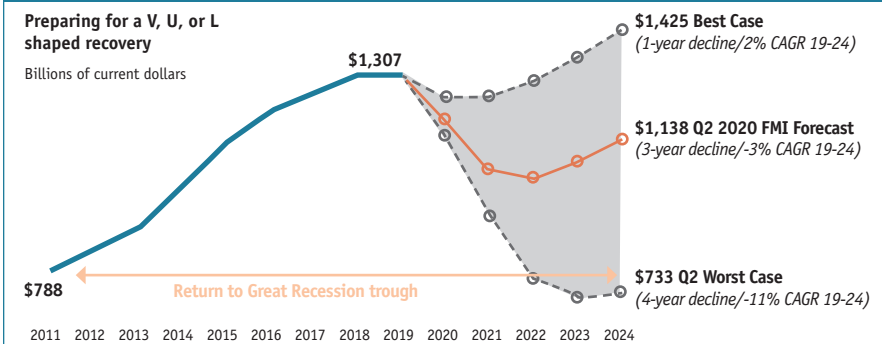


Valve Repair Council





## Total construction spending, projections through 2024



for the construction industry (See chart above). The best case might be a one-year decline, with a 2% compound annual growth rate (CAGR) for 2019–2024. The worst-case crash might take the industry below the Great Recession level, with a 4-year decline producing a CAGR of minus 11% for the same period. A middling, and perhaps more likely result, might be a 3-year decline with a CAGR of minus 3%.

Amid all the gloomy news and forecasts, however, there are also positive developments as certain segments continue to

grow. Regardless of economic conditions, bull markets and bear markets co-exist in the construction industry, Bowman said. "There will always be growth opportunities, no matter what kind of economy we find ourselves in. We've seen this time and time again." He predicted that this time around on the commercial side, biomedical/pharmaceutical, cold storage/distribution and communications/data centers will be part of the bull market while lodging, commercial and amusement/recreation will be bears.

This kind of bull/bear concurrence has happened before. For example, from the 2006 peak to the 2011 low of the Great Recession, the housing sector of both single and multifamily dwellings, which normally makes up 40% of construction, showed a decline around 70%. Many other sectors also declined. However, six sectors showed growth: health care, highway and street, manufacturing, transportation, public safety, conservation and development and power. The latter grew 80% during that period.

In general, Bowman said that "This is not necessarily a time to be frightened." However, preparing for multiple scenarios is prudent. Plan ahead and then be willing to act. Bowman said that after the last recession, leaders at many companies told him, "We did the right things, but not soon enough." **WM**

**GENILEE PARENTE** is managing editor and **BARBARA DONOHUE** is Web editor for VALVE Magazine.

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# The Actuators That Drive Subsea Operations

BY KARAN SOTOODEH

The offshore oil and gas industry began in 1947 when the first well defined as “out of sight of land” was completed at a depth of only about 15 feet (4.6 meters) of water in the Gulf of Mexico. Since that first well was drilled, the offshore sector of oil and gas has become a vital part of where we get these valuable resources. Because of this, exploration and production have moved to deeper and deeper water depths. Nowadays, producible oil and gas are commonly found at depths that are half-a-mile to two-and-a-half miles (1 to 4 kilometers).

Subsea development is generally divided into two categories: shallow depth and deep-water. The subsea developers’ main goal is to select the optimum way to safely and economically extract the resources from the oil fields. Figure 1 illustrates a typical subsea production unit.

Subsea development includes different types of activities such as exploration, drilling, completion and production. The concept of developing subsea oilfields was born in the early 1970s, using subsea wellheads and Christmas trees, as well as production components and equipment such as manifolds, jumpers and pipelines on the seabed. A key benefit of retrieving oil and gas through subsea oilfields is that these fields improve the production process and allow recovery from reservoirs. The other advantages of subsea operations are that they save costs by reducing space required for topside facilities on a platform or on a floating production storage and offloading vessel (FPSO) and by reducing the large

## Executive Summary

**SUBJECT:** Many oil and gas operations around the world are located offshore and at least partly submerged. To get to those sources efficiently requires special equipment, including subsea actuators.

### KEY ISSUES:

- Types of subsea actuators used
- Standards and pressure ratings
- Other considerations

**TAKE-AWAY:** Although hydraulic and electric actuators are common in subsea operations, electric offers some advantages.



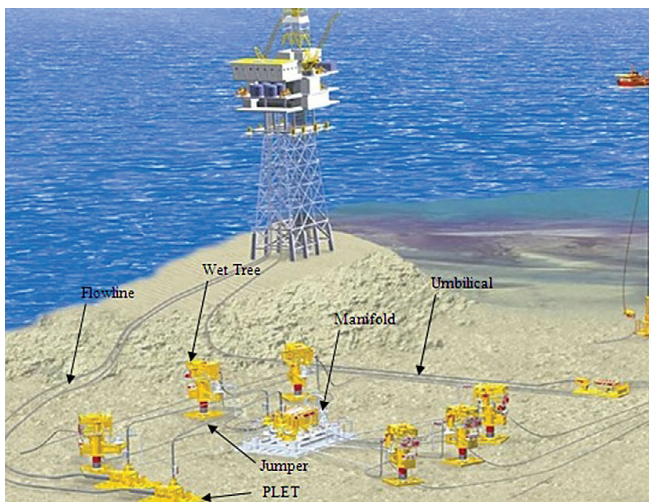


Figure 1. A typical subsea production unit (Courtesy: Elsevier)

volumes of untreated hydrocarbon that must be transferred from deep subsea depths to the surface.

Subsea actuators are located mainly on Christmas trees (Figure 2) and manifolds.

Subsea wells are made up of the downhole well completion components and the subsea trees. Completion is the process of making a well ready for production and injection into the well after drilling. A drilled well is a closed series of piping, fittings and valve assemblies (Christmas trees) that gather the reservoir fluid from the wellhead and direct the produced hydrocarbon to production facilities.

Subsea manifolds are the arrangement of piping, valves, connections, structures and the foundation used in the subsea production system to receive, combine and distribute the hydrocarbon fluid. These manifolds simplify the subsea system by saving the quantity of piping such as pipeline and flow lines that would be needed to transport to other locations for production. Subsea manifolds can be connected to wellheads

Figure 2. A subsea Christmas tree (Courtesy: Technip FMC)



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## ACTUATION

The actuator is the machine component installed on the top of the industrial valve for automatically or remotely moving and controlling (operating) the valve. The quality of any valve depends on many parameters, including design, material selection, mechanical strength, quality control, manufacturing and more; whereas the performance of the valve is largely dependent on the actuator.

Although all three types of actuators—hydraulic, pneumatic and electrical—are used for industrial valves in other sectors of oil and gas; subsea operations use only hydraulic and electrical actuators.

Subsea actuators are designed and tested mainly through guidelines from the American Petroleum Institute (API) and the International Organization for Standardization (ISO). Each API standard used for subsea valves and actuators has an equivalent ISO standard as follows:

- 1) API Spec.17D, Design and Operation of Subsea Production Systems-Subsea Wellhead and Tree Equipment, identical to ISO 13628-4
- 2) API Spec. 6A, Wellhead and Tree Equipment, identical to ISO 10423.

Several types of actuator designs are used in subsea operations including linear, scotch yoke, and rack and pinion.

Linear actuators are used for subsea gate valves for creating motion in a straight line with linear motion of the stem as well as the closure member (the disk or gate). Linear actuators are spring return with fail-safe closed function in most cases. Linear actuators can be made with double-acting function, but this type of configuration is not common.

Scotch yoke actuators are common for subsea ball valves with quarter-turn or 90-degree motion of the ball for cycling (opening and closing). These actuators can also be made in single-acting or double-acting versions. The single-acting actuator is a spring-return type. It is open in the fail-safe open mode or closed in the fail-safe closed mode with the spring force.

Double-acting actuators normally produce higher force

Table 1. Temperature classes according to API 6A/ISO 10423

Temperature Class	Temperature Range			
	°C		°F	
	min.	max.	min.	max.
K	-60	82	-75	180
L	-46	82	-50	180
N	-46	60	-50	140
P	-29	82	-20	180
S	-18	60	0	140
T	-18	82	0	180
U	-18	121	0	250
V	2	121	35	250

NOTE: Minimum temperature is the lowest ambient temperature to which the equipment can be subjected. Maximum temperature is the highest temperature of the fluid that can directly contact the equipment.

**“Rack” and “pinion” refers to two gears: the rack has linear motion while the pinion has rotary motion.**

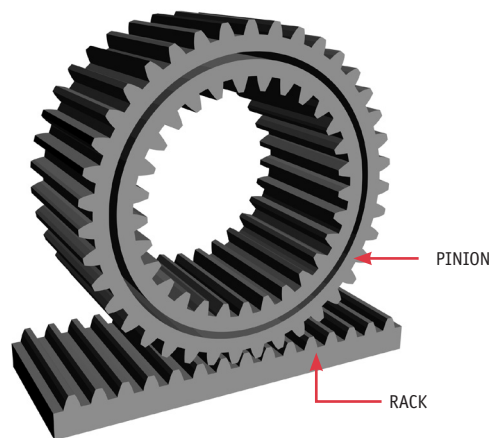


Figure 6. Rack and pinion

(or torque) compared to single-acting actuators. These are being opened and closed via hydraulic oil pressure. The linear movement of the piston rod is transferred to the yoke and the pin, which transfer the linear movement to rotary movement for 90-degree rotation of the ball valve closure member.

Rack and pinion actuators are common for subsea ball valves with quarter-turn or 90-degree motion of the ball for cycling (opening and closing). “Rack” and “pinion” refers to two gears: the rack has linear motion while the pinion has rotary motion (Figure 6). The linear motion of the rack is achieved through hydraulic force, and it is transferred to the pinion, which moves in rotary and cycles the valve to open or closed positions at 90 degrees.

## PRESSURE AND TEMPERATURE RATINGS

For all intents and purposes, a hydraulic actuator is a cylinder that converts hydraulic fluid power into mechanical work or force. Because of the nature of what they do and where, subsea actuator hydraulic pressures can be much higher than the pressure of topside and onshore actuators—values can be more than 3,000 psi (207 bar), more than 5,000 psi (345 bar) or more than 5,500 psi (380 bar). Hydraulic pressure of 5,000 psi (345 bar) is standard for subsea actuators in deep-water applications. The design pressure of the actuators is normally 1.1 times the operating pressure, so the design pressure of an actuator with a hydraulic supply pressure of 5,000 psi (345 bar) is 5,500 psi (380 bar).

Table 1 provides temperature rating classes in the API 6A/ISO 10423 standard. The minimum rated temperature for the actuator should be selected from the minimum temperature values given in this table unless otherwise required by the end user or in the project specification. The upper working temperature of the actuator should not be less than 149°F (65°C) and the maximum upper value of the working temperature could be standardized at that temperature.



## OTHER SUBSEA CONSIDERATIONS

Actuated valves are normally supplied with a remotely operated vehicle (ROV) override for the operation of the valves independent of the actuators. ROV override, as a backup for valve actuation, is beneficial in case the actuator fails to function. ROV override interface class is selected based on API 17H/ISO 13628-8, Remotely Operated Vehicle on Subsea Production Systems. ROVs are free-swimming submersible craft used for the operation of the subsea valves and actuators. The vehicle has arms and fingers, which carries a torque tool for the operation of the ROV override.

Subsea valves and actuators must also deal with seawater column external pressure. As a rule of thumb, each 32-foot (10-meter) water depth applies 14 psi (1 bar) pressure to the subsea components. Therefore, an actuator installed at water depths of more than 1.8 miles (3,000 meters) receives about 4,351 psi (300 bar) seawater external pressure. One solution to handling this kind of challenge is to increase the thickness of the actuator, which makes the actuator much heavier. A common alternative is to use a capsule filled with pressurized oil almost equal to seawater external pressure. This is connected to the actuator spring housing, which is called the compensator or compensation system.

## ELECTRIC ACTUATION

The other important consideration in talking about subsea actuation is shifting from hydraulic to electric actuators, which is known as a state-of-the-art modification in the subsea sector of the oil and gas industry. This change of actuator operators to electric offers simplification, cost reduction and an environmentally friendly solution. This is because spillage of hydraulic oil is harmful to the environment, potentially damaging marine life and the ecosystem.

Removing the hydraulic oil from the actuator picture also avoids exposing personnel and operators involved in hydraulic actuator manufacturing, testing, inspection, transportation and more.

Because of this, using electrical

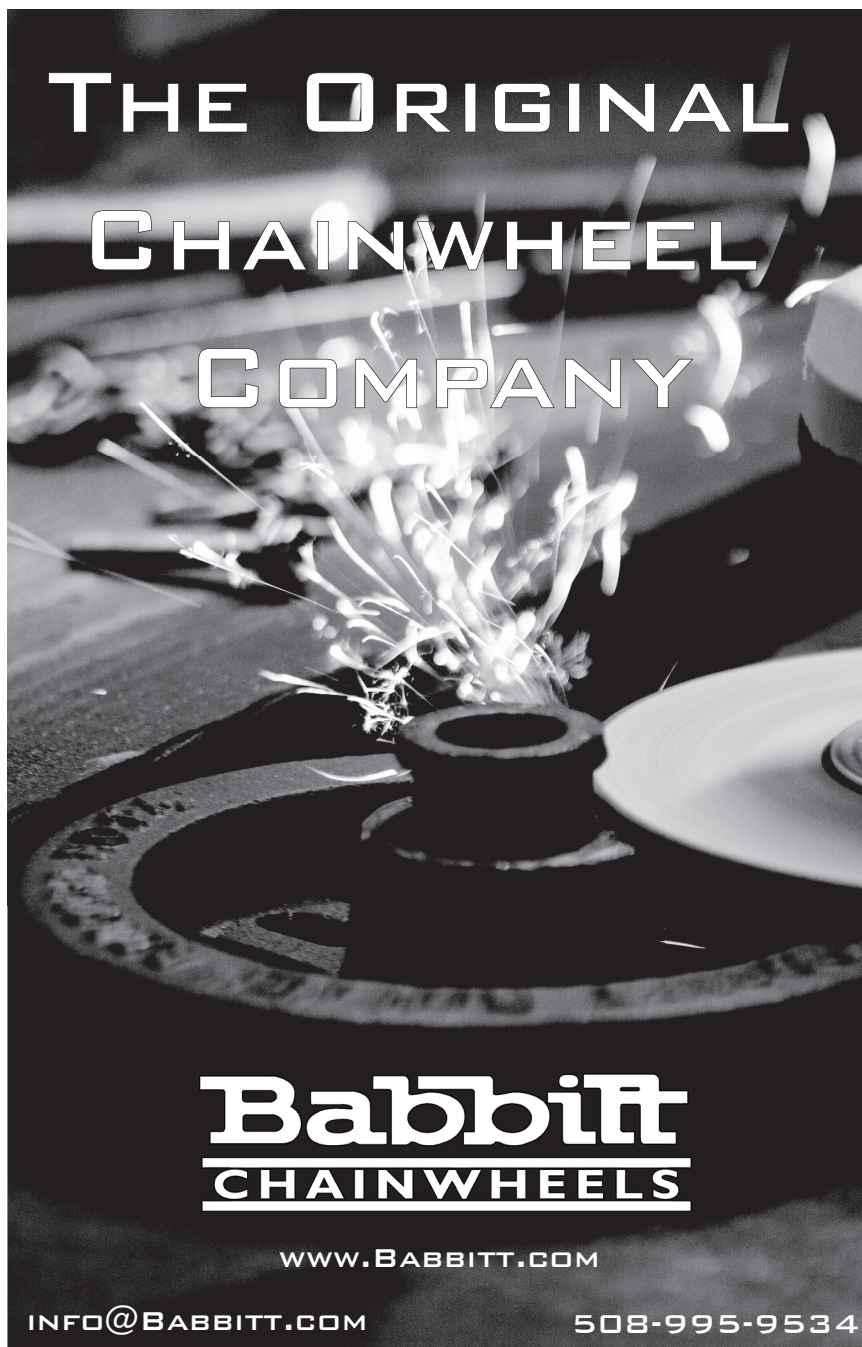
actuators is considered beneficial from the health, safety and environmental point of view. Other advantages associated with using electrical actuators can include response time, reliability, efficiency and functionality of the subsea system.

No matter the type, however, knowing how they operate and what challenges they face under the sea can help those who specify and put into place the equipment find the right solution for a project. **WM**

**KARAN SOTOODEH** is senior/lead engineer, valves and actuators for Baker Hughes. He can be reached at [karan\\_sqi@yahoo.com](mailto:karan_sqi@yahoo.com).

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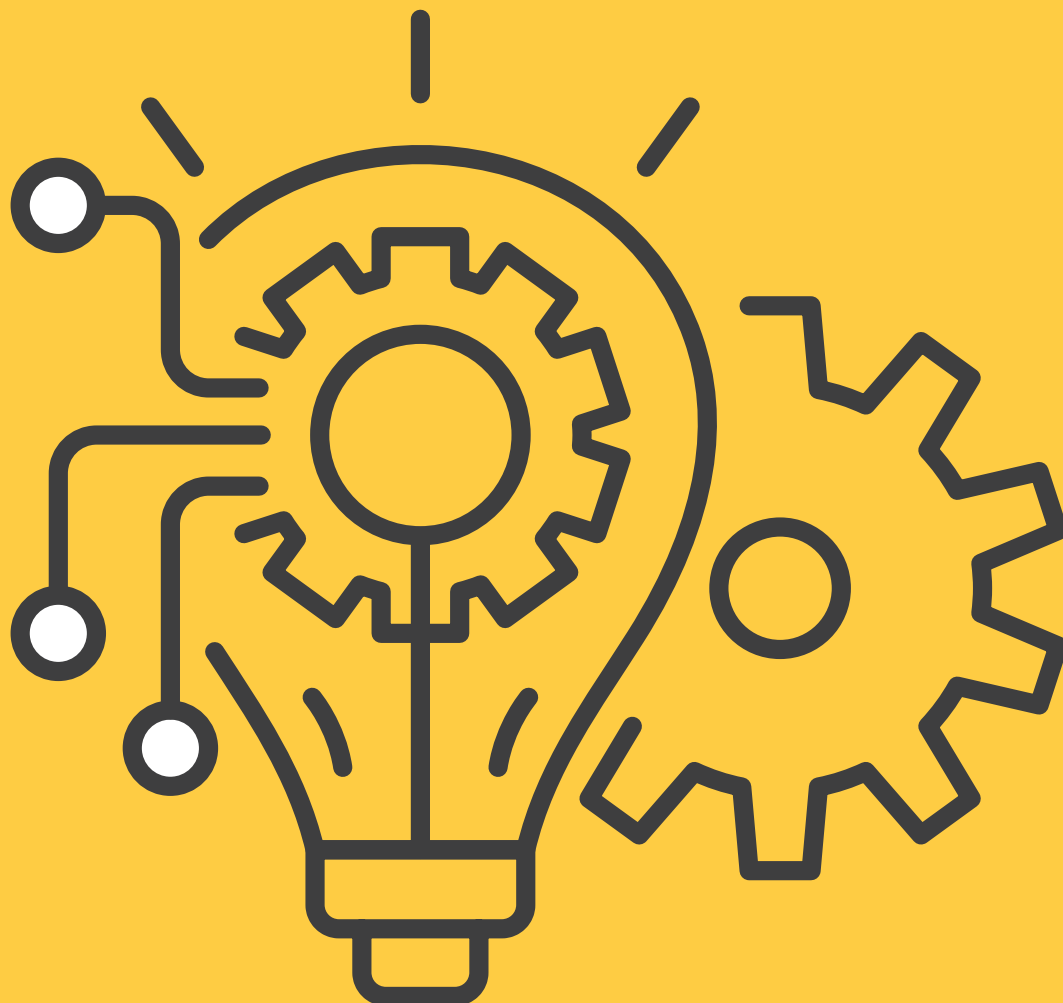
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# INNOVATION



## Helping Customers Cope with Today's Challenges

BY GENILEE PARENTE

Today's world looks very different than it did just a year ago. The pandemic has added to the list of what users of valves and related equipment faced in the past. However, as with many of life's interruptions, the current challenges have also brought creative new tools.

### Executive Summary

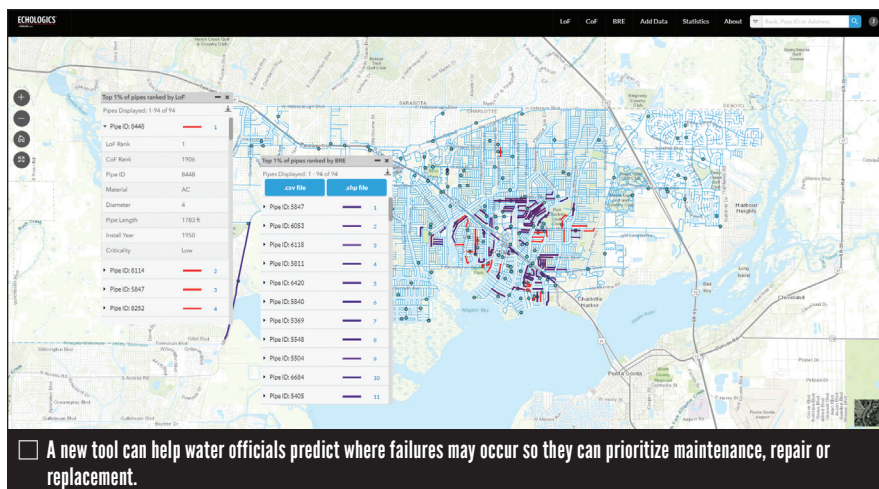
**SUBJECT:** VMA members are finding new ways to help their customers operate in the current climate.

#### KEY ISSUES:

- Water infrastructure challenge
- Social distancing demands
- Dealing with remote needs

#### TAKE-AWAY:

The needs of customers may look different than years past, but the solutions reflect members' continued commitment to using innovations to create those solutions.



## FACING THE AGING WATER SYSTEM

One of the most acutely felt challenges in the business of water/wastewater today is the failure of systems and piping, which are aging faster than many municipalities and water authorities can react. At the same time, however, the technology to improve the systems and help managers cope is also improving rapidly.

At the beginning of September this year, Echologics, a Mueller brand, announced a new tool in its arsenal of leak detection and condition assessment products and services: a virtual tool that can predict future failures in piping systems much more accurately than using age-based estimates or models based on prior failures of similar equipment.

PipeRank Virtual Condition Assessment leverages on-site specific historical failure data and identifies factors of a specific pipe network that will likely cause failure. The result gives equipment planners a tool that can help them prioritize according to which pipes will break next. The result is a much more accurate way to predict and model possible failures, better insight into the condition of specific parts of a piping network and a useful tool for making decisions on where capital expenditures should go first.

A model on Echologics' website shows just how much more accurate this type of virtual tool can be: It compares models based on prior failures of similar pipes, or estimates based on age with what PipeRank can do: the new tool correctly placed 77% of actual pipe failures that occurred in the top 5% of pipe segments likely to fail. That

compares to 16% for prior failure models and 44% for age-based models.

The new technology pairs available pipe information from a geographic information system with a proprietary machine learning model to prioritize every pipe segment analyzed by "Likelihood of Failure." The data that goes into that model includes construction data such as materials used, age of equipment, diameter, presence of a factory or field liner in the equipment as well as environmental factors such as soil, water and satellite data. The system can then produce risk profiles for 1 to 20 years, which helps utilities reduce pipe failures and also to reduce non-revenue water issues (when water is produced but lost before it reaches the customer) and prevent premature pipe renewals/replacements.

Understanding where pipe breaks are most likely to be can help both for long-term planning for replacements and in improving day-to-day operational activities. Specific to valves, utilities have used this technology to target valve turning and replacement programs. Making sure the valves in leak-prone areas are in good working condition ensures that pipe shut-down and repairs can be conducted efficiently with minimal impact to ratepayers.

"During this unprecedented time, a virtual tool that can provide all this with more accuracy can be invaluable to water utilities that need to plan and maintain their water infrastructure service while keeping their workforce safe and well," said Eric Stacey, general manager of Echologics.

## DEVELOPING CRUCIAL PHARMA TOOLS

Automation is being touted as the "unsung hero" in the war against the COVID-19 pandemic because of how it is speeding up the process of bringing a vaccine into reality and presenting new ways to social distance and keep people safe.

Emerson is developing technology and advanced products that can help with those challenges including tools that allow the pharmaceutical manufacturing industry to develop and bring medicines to market faster and a new tool designed to make it easier for workplaces to social distance.

In early September, Emerson announced a new program called the DeltaV Life Sciences OEM Program designed to help life science companies more easily adopt manufacturing methods that are digitally-enabled. Emerson will work with participants in the program to develop pre-engineered solutions that integrate advanced laboratory and manufacturing skids with Emerson technology such as pre-built configuration template libraries and cloud engineering tools. The result will be faster engineering and seamless collaboration between Emerson and OEMs, which will allow customers to more quickly integrate advanced technology into existing manufacturing processes.

Emerson also released a new equipment tool that is a pressure transmitter (Rosemount 550PT) designed for single-use bioprocessing applications. Single-use instrumentation speeds up the process of developing and making a new medicine by increasing flexibility and scalability. Single-use processes

A single-use bioprocessing transmitter allows faster medicine development.





allow manufacturers to address targeted patient populations and reduce time to market.

As far as the social distancing technology, Emerson announced in mid-August that it had enhanced its location awareness technology so that it includes social density management and contact tracing. Location awareness technology provides “relevant-time,” safety-focused monitoring of personnel providing alerts for certain safety factors. Enhanced geofencing in the technology enables manufacturers to design areas that limit the number of personnel in specific locations to promote social distancing. One of the alerts that can be sent out would tell plant managers when the number of people in a given area exceeds predetermined thresholds.

“Worker safety has always been paramount for our customers, but now more than ever, they need tools to help them manage employee exposure risks and navigate new regulatory requirements,” said Bob Karschnia, vice president and general manager

of pervasive sensing at Emerson’s Automation Solutions business.

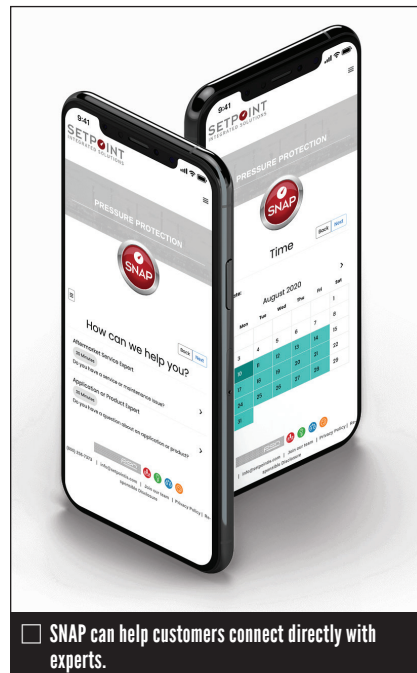
### CONNECTING WITH EXPERTISE

One of the realities of what the COVID-19 pandemic has created is that people are increasingly finding ways to conduct business without meeting in person. Some member companies have developed their own tools that allow their customers to interact with their staff and sales force for information and to schedule deliveries or supplies.

Setpoint Integrated Solutions recently released SNAP, an online booking tool that connects customers remotely with its staff experts.

The online booking tool helps to set up virtual meetings between people who need specific information and experts who can provide it via the internet or phone calls.

As Setpoint explains, one of its main customers, the petrochemical industry, relies heavily on a network of contractors and distributors to supply and maintain process facilities.



☐ SNAP can help customers connect directly with experts.

That network is critical in day-to-day operations.

The new Setpoint tool uses the website’s home page to allow people to get the answers they need in just 4 clicks. The initial click is to ascertain

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whether people need information on pressure protection, control valves, instrumentation & distributed products or isolation valves & automation. The next level asks more specifically which type of expert is needed such as “aftermarket” or “application/product expert” (for instrumentation & distributed production). The next click takes them directly to the team of experts that can help them then allows users to set up meetings via google, a phone call or by getting an expert to contact them in another way.

“This solution addresses an immediate need to improve communication during the pandemic, and is part of a broader, company-wide, drive to deliver a best-in-class customer experience,” says President and CEO Jeff Birch.

### REMOTE SOLUTIONS

ValvTechnologies has found a way to more safely allow people on the job to help customers. The VirtualValv support system, which was announced in early August, is designed to help with remote installations and maintenance



□ A virtual headset pairs with innovative new software for live remote assistance.

services by providing support to any location at any time.

The tool includes innovative software for live remote service assistance allowing certified technicians and on-site staff or customers to interact in real-time using hand gestures and augmented 3D scans. Cell-phone hotspots can be used, and the equipment can record what’s happening.

A recent example of how it works was a project in Malaysia affected by the limit on travel. A service team based in India was originally scheduled to do the work. Instead of going on-site, the new system was sent to the location and programmed with all the necessary procedures for a full electronic relief valve overhaul. The team in India oversaw the repairs remotely to ensure the work was done according to standards.

“During these uncertain times in which social distancing and travel restrictions are being mandated across the globe, it’s imperative that we find alternative means to support our customers to ensure the safety and efficiency of their operations,” said Bill Morris, ValvTechnologies’ International Service Manager. “By utilizing cutting-edge technology, ValvTechnologies and its customers can collaborate on troubleshooting valve maintenance or repairs to avoid costly downtime.” ❧

GENILEE PARENTE is managing editor of VALVE Magazine. Reach her at [gparente@vma.org](mailto:gparente@vma.org).

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# Using IoT for Supply Chain Visibility

BY STEPHEN CHERLET

Being old fashioned, I still thumb through physical journals and tear out pages. In preparation for writing this article, I spent time reviewing interesting pieces I recently got from industry magazines. One factor I noticed was that every article on the subject of the Internet of Things (IoT) was about applications inside the factory. For example, there were articles on machine monitoring, equipment monitoring, preventive maintenance and similar topics.

IoT is relevant for all these areas, but its relevancy begins before the factory floor comes into play and continues beyond that factory. Flipping through the articles I found, I had to wonder: why is no one writing about IoT in the supply chain? Production cannot occur and customers cannot sell what isn't in hand. IoT is a useful tool for pinpointing where materials are in the supply chain to ensure their timely delivery.

These materials cover the full gamut of the manufacturing process—starting with sourcing raw materials or purchased items, then moving them to the factory and finally getting the finished product to the job site and stock to distributors. At each of these steps, everyone wants to know where their materials or products are and when they are going to arrive.

A variety of solutions are out there that offer supply chain visibility, and each offers a subset of features that answer different questions. For example:

- Global positioning system (GPS) trackers show where a truck or a package is.
- Data loggers show what a load experienced in the past.
- Real-time IoT monitoring reveals where a container and its contents are *right now*.

There also are multiple players in the IoT field for supply chains with more entering the market all the time. Each offers different technology, with different purposes and different ways of bringing their solutions to the



There are many ways today to better track the supply chain using new digital tools.

market (for example: is it coming by purchase or by subscription?). This article cannot cover the full range, but we can look at a few highlights.

## DEVICES

Today, it seems like there is a device for almost every need along the chain. Those devices might fit inside small packages, communicate between packages, roll-up data to a container/trailer or monitor the container and its environment. Some can monitor the tractor of a tractor-trailer combo and connect with an electronic logging device. There even are devices that can be mounted to valves on a tanker trailer to monitor opening/

closing or to determine if cargo is being dispensed or stolen. The candy bar-sized device shown in Figure 1 is used for parcel or air cargo tracking.

## COMMUNICATION TECHNOLOGY

The most prevalent and cost-effective means of transmitting IoT data back to a monitoring system is via the cellular network. Global System for Mobiles (GSM) is the most popular network, but others are used as well. Although more expensive, some solution providers also offer satellite telecommunications. This is important if data beyond GPS information needs to be transmitted while the cargo is out of range of cell-phone networks. The main application would be cargo at sea. To offer affordable solutions for ocean freight, many providers use GSM when their devices are within range of the cell-phone network and then switch over to satellite technology when out of cellular range. The service provider switches from GSM (which allows real-time data transmission of GPS and the environment) over to the ship's satellite Automatic

Figure 1. Parcel or air cargo tracking device



AR/TEM AG



## SOME OF THE PLAYERS AND WHAT THEY DO:

**Arviem** – subscription-based; dry sea containers and multimodal shipments

**Globe Tracker** – ocean freight

**HanHaa** – parcel, airfreight

**Hi-G-Tek** – trailer monitoring, especially tanker trailers

**Orbcomm** – fleet, trailer, container

Identification System (AIS) which provides info on the GPS of the ship itself. AIS is a vessel identification and tracking system used for collision avoidance, identification and location information. When the device is out of range of the cellular network, it acts only as a data logger. Once back in range, the recorded history is transmitted.

Those with time or the inclination can take a look at some of the free portals offering access to a ship's AIS information, such as vesselfinder.com and marinetracker.com. These free offerings are limited to the number of vessels monitored, reports/alerts sent or days of access. Poking around gives the curious a taste of what is available. However, to do this requires the vessel's identification data and what is shown is only the ship's location. These offerings do not provide any information on environmental conditions or what is on board.

For land-based devices, LoRaWAN is used in some applications. This is a long-range, low-power wide-area network system governed by the LoRa Alliance, an association created in 2015 to support the LoRaWAN protocol and ensure interoperability of LoRaWAN products and technologies. This is likely to be used most often for stationary devices or those operating in a fixed area such as a mine site, well-head or pumping station. The data transmissions are typically encrypted for security.

## BEYOND GPS

Most solutions combine GPS tracking with data recording and transmission. This is the key to providing visibility in the supply chain. The device in Figure

Figure 2. Ocean container tracking device



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2 is specific to dry ocean containers. Clamped magnetically to the container roof at the door area, it transmits GPS information, door opening/closing, temperature, humidity, and shock data back to the monitoring system via GSM. The service provider leverages the ship AIS system when this device is out of cellular network range.

Most service providers offer a simple interface similar to Google Maps. By calling up a tracker ID, users can visualize a map with current GPS information. Drilling down allows visualization of any of the recorded information across the full history of the trip to date (Figure 3).

DOOR CLOSED EVENT	2020-05-19 09:19:12
DOOR OPEN EVENT	2020-05-19 09:16:04
DOOR CLOSED EVENT	2020-05-19 09:05:41
TEMPERATURE NORMALIZED EVENT	2020-05-19 08:58:43
DOOR OPEN ALARM	2020-05-19 08:58:43
TEMPERATURE NORMALIZED EVENT	2020-05-19 07:47:16
TEMPERATURE ALARM	2020-05-19 00:15:40
TEMPERATURE ALARM	2020-05-19 18:17:14
DOOR CLOSED EVENT	2020-05-19 14:04:52
DOOR OPEN ALARM	2020-05-19 13:57:28

Figure 3. Example of GPS tracking data

This is valuable information, but many readers may want to know how these solutions can help in the real world. The following are several real-life results from a cargo track-and-trace solution provider.

#### EXAMPLE 1—(MIS)ROUTING

Imagine a scenario where valves are shipped from the U.S. to a construction site in the Philippines. Once the container with the product is on the ship, companies typically have no information about the outbound voyage. However, if late delivery penalties could be applied, you certainly would want to know what's going on. Also, if you paid a premium for a specific delivery routing, you want to ensure

Figure 4. Example of what can be shown for routing



### Most service providers offer a simple interface similar to Google Maps. By calling up a tracker ID, users can visualize a map with current GPS information.

you get what you paid for. Figure 4 is an example of a solution that offers that kind of information.

#### EXAMPLE 2—INSURANCE CLAIM SUPPORT

If cargo is sensitive to shock or tilt, sensors can be installed that will show if a limit has been breached (a "tattletale"). This doesn't reveal where the limit was exceeded, so you cannot use this solution to pinpoint which party to pursue for a claim. If you added a date-time and geolocation stamp, however, that data can be used to support a claim. GPS positional accuracy can be within 32 feet (10 meters), so you know when and where things went off the rails. Temperature, humidity, light, movement and other environmental conditions can be monitored, and tilt or rollover detected. Shippers can receive email or text alerts if the upper or lower limits of any monitored element are breached.

Beyond environmental monitoring, there are geo-fences for high-value shipments. Shippers can be notified if a load goes "out of bounds" or if doors are opened when they shouldn't be (Figure 5)

#### EXAMPLE 3—PORT BOTTLENECKS AND DELAYS

Logistics teams have great difficulty trying to find out where a shipment is or was. Inside some planning offices

Figure 5. Geo-fence data

Door Opened Alarm	
Measurement Time:	2020-15-18 13:24:07 (UTC)
	2020-00-16 05:24:07 (Unreadable)
GPS:	-16.52084200, -68.16909000
Door Open:	true

of the past, tracking was rudimentary, often consisting of binders or bulletin boards full of faxes from carriers or forwarders. The worst problem was not knowing where an overdue load was on its route. Anyone who has experienced unplanned port disruptions knows what I mean. I vividly recall waiting weeks to find out the status of a container stuck in the port of Rotterdam during a particularly heavy shipping season. Wouldn't it be nice to check the status online? Not only could you "see" where the load is now, you could tell how long it has been there (Figure 6).

Figure 6. Location data

> Distribution Centre (GH)	1h
> Port Tema (GH)	+12d 21h
> MSC	3d 0h
> Port Lome (TG)	+1d 22h
> MSC	2d 0h
> Port Lagos (Apapa / Tinian) (NG)	+20d 7h
> Distribution Center (NG)	+19h

#### WRAP-UP

Beyond tracking of individual shipments, cargo tracking and tracing solutions can build up a wealth of data that can then be analyzed for future decision-making. For example, carrier performance can be tracked, route selections modified for better delivery, damage analyzed by route or carrier and much more. This is where IoT of the supply chain can be a real value-added tool that supports the logistics team. Best of all, this information can be only a click away. **WM**

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**72 day** transit time from California to Philippines with containers transhipped in Port of Hong Kong

- 1 Mother vessel stopped in Port of Yantian (30km from Hong Kong) on January 15<sup>th</sup> and continued to Vietnam & Cambodia
- 2 Mother vessel continues to Vietnam, returning to Hong Kong on January 25<sup>th</sup>
- 3 Containers were offloaded in Hong Kong and sat for 21 days waiting for the feeder vessel to the Philippines
- 4 Containers arrive at final destination on February 26<sup>th</sup>





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# An Overview of ASME B16.34-2017

BY BARBARA DONOHUE

The content of American Society of Mechanical Engineers (ASME) Standard B16.34 is essential to those who deal with flanged, threaded and welded-end valves. The standard covers pressure-temperature ratings, materials, marking and other characteristics of cast, forged and fabricated valves.

To help understand the standard, Mitchell Anderson, technical director for butterfly valves and engineering quality at Bray International Inc., presented a VMA Webinar overview for purchasers, specifiers and users of valves. A few highlights of what he covered are included here.

Anderson began by explaining the different types of documents that apply to valves and their applications. Codes provide sets of rules and regulations. Standards provide specifications for how equipment is designed and how to assure quality. Recommended practices provide guidelines and good engineering practices.

## WHAT B16.34 COVERS

Because it's a standard, B16.34 "focuses on design and quality. You'll see it doesn't address applications," Anderson pointed out.

The ASME B16.34 standard also is referenced in many other standards and codes put out by other organiza-

tions, he added.

ASME B16.34 includes the following sections:

- Scope
- Pressure-Temperature Ratings
- Pipe Size
- Marking
- Materials
- Dimensions
- Pressure Testing
- Special Class Valves
- Mandatory Appendices
- Non-Mandatory Appendices

## SCOPE

Scope is the first consideration when reviewing any code, standard or recommended practice, Anderson said, because people have to understand this section to see if what they're trying to evaluate is covered by a particular standard. For this reason, he considers this section one of the most important parts of any standard.

The scope section covers considerations such as pressure-temperature ratings, dimensions, tolerances, materials, nondestructive examination requirements, testing, and marking for certain types of valves made from steel, nickel-based alloys and some other materials listed. Additional requirements included within the scope section address:

- Pressure and temperature at the time of purchase, manufacture and installation
- User accountability
- Selection of valve types and material service conditions
- Valve class and pipe size (NPS & DN) designations
- Cryogenic valves

## MATERIALS

The materials section is divided into groups of materials types and sub-groups of similar materials with common pressure-temperature ratings. Anderson referred to Table 1 in the standard to explain those groupings. Group 1 is carbon and low-alloy steels; Group 2 is stainless and duplex materials; and Group 3 is nickel and nickel alloys. Under these categories are 49 sub-groups.

Figure 1 shows the American Society for Testing and Materials (ASTM) specification and grade for common carbon steel. This table is one of the most important aspects of the standard, Anderson said, and it can be hard to understand. He explained that, in the table, the common carbon steel materials used for valves are forged material to ASTM A105 and the cast material to ASTM 216 grade WCB.

Figure 1. Example from Table 1 – Material specification list; Applicable ASTM specifications (Source: ASME B16.34)

### Common Carbon Steel

Material Group No.	Nominal Designation	Forgings		Castings		Plates		Bars		Tabular	
		Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade	Spec. No.	Grade
GROUP 1 MATERIALS											
1.1	C-Si	A105	---	A216	WCB	A515	70	A105	---	---	---
	C-Mn-Si	A350	LF2	---	---	A516	70	A350	LF2	A672	C 70
	C-Mn-Si	---	---	---	---	A537	Cl. 1	A696	C	A672	B 70
	3½ Ni	A350	LF3	---	---	---	---	A350	LF3	---	---
	C-Mn-Si-V	A350	LF6 Cl. 1	---	---	---	---	A350	LF6 Cl. 1	---	---

A106 Gr. C (1)	A203 Gr. E (2)	A350 Gr. LF6 Cl. 2 (3)	A352 Gr. LC3 (4)				
A203 Gr. B (2)	A216 Gr. WCC (2)	A352 Gr. LC2 (4)	A352 Gr. LCC (4)				
A — Standard Class							
Temperature, °F	Working Pressures by Class, psig						
	150	300	600	900	1500	2500	4500
-20 to 100	290	750	1,500	2,250	3,750	6,250	11,250
200	260	750	1,500	2,250	3,750	6,250	11,250
300	230	730	1,455	2,185	3,640	6,070	10,925
400	200	705	1,405	2,110	3,520	5,865	10,555
500	170	665	1,330	1,995	3,325	5,540	9,965
600	140	605	1,210	1,815	3,025	5,040	9,070
650	125	590	1,175	1,765	2,940	4,905	8,825
700	110	555	1,110	1,665	2,775	4,630	8,330
750	95	505	1,015	1,520	2,535	4,230	7,610
800	80	410	825	1,235	2,055	3,430	6,170

**NOTES:**

(1) Not to be used over 800°F.

(2) Upon prolonged exposure to temperatures above 800°F, the carbide phase of steel may be converted to graphite. Permissible, but not recommended for prolonged use above 800°F.

(3) Not to be used over 500°F.

(4) Not to be used over 650°F.

**DON'T MISS  
IMPORTANT  
NOTES**

Figure 2. Example from Table VII, ratings for Group 1.2 materials (Source: ASME B16.34)

## PRESSURE-TEMPERATURE RATINGS

B16.34 uses metric units with additional tables and information in U.S. units. Tables 2 (metric) and VII (U.S. customary units) give pressure-temperature ratings for each listed material.

Figure 2 shows an example of pressure-temperature ratings for materials in Group 1.2. The valve design temperature is selected from the left column and the valve pressure class is listed above. Those two comparisons on the chart show the pressure-temperature rating. For example, if a valve is made from A106 Grade C and designed to Class 150, at an operating temperature of 200°F, the pressure-temperature rating is 260 psig. If its operating temperature is 750°F, the pressure-temperature rating is 95 psig.

The table is set up by groups of similar materials, but even within a group, variations and limitations to use exist, especially regarding operating temperatures. Figure 2 shows some of those variations in the form of important notes to consider. For example, for A352 Grade LCC, note 4 indicates that it should not be used over 650°F. It is critical that users pay close attention to those notes, Anderson said. This is because of situations such as this: at first glance, since the table goes

up to 800°F, a user might assume all the materials could be used at that temperature, but the note warns that some of the materials must be limited to 650°F.

"People may be tripped up by notes and references," Anderson said. But they are there to point out vital information. They may seem a nuisance because they lead down a long trail, but that trail is very important for knowing a material's limitations, he said.

## MARKING

The ASME B16.34 marking specification complies with Manufacturers Standardization Society (MSS) SP-25 standard-marking system for valves, fittings, flanges and unions.

The minimum requirements for marking valves are:

- Name of manufacturer
- Materials of body, bonnets, cover plates
- Pressure rating
- Temperature
- Size

In addition, if a valve complies with B16.34, it can be stamped "B16.34" on the nameplate.

## STANDARDS CHANGING OVER TIME

As with other standards, B16.34 is

periodically updated and improved. The most recent revision was in 2017.

Anderson warned webinar attendees to be aware that change is part of the process and to try to keep up to date. When a change is made to one standard, changes may also apply to other referenced standards or codes. Each new version refers specifically to what changes have been made.

Anderson gave an example of a change in the standard and how it could lead to confusion:

Material group 2.8 is listed for duplex stainless materials. Several years ago some of the ASTM specs for duplex materials were changed. They were originally listed as A351 then became ASTM 995. This has caused some confusion, Anderson explained. Most people when they think of duplex materials think of grade 4A or 6A. But currently, for castings, grade 4A is listed as CD3MN and 6A is listed as CD3MWCuN.

Anderson pointed out that though it is sometimes difficult to keep track of all that happens with these standards, understanding them, including B16.34, is critical to providing valves that will operate successfully in the environment where they're put into action. **VM**

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# Practical Steps for Retaining Expertise

BY JOHN MOLLOY

Losing the skills of experienced, trained engineers has always challenged OEMs. The situation has been complicated in recent times by the many manufacturers across a multitude of industries faced with a growing number of tenured employees moving into retirement.

It's made even more challenging because teams across those various industries are increasingly being tasked with balancing these expertise losses with shorter timeframes for projects and tighter resources.

Manufacturers are charged with reducing product spending while maintaining and growing market share: But they must do so without sacrificing quality.

Without trained engineers, overengineering is a potential problem, which means higher cost of design and the resulting drop in sales. At the same time, underengineering and purchase of lower-priced, lower-quality parts is also a potential problem that can raise the cost of maintenance and repair down the road, eventually serving as an even greater cost drain.

Still, there are practical ways to address the loss of long-term, hands-on engineering expertise. Here are some tips:

**Online or app-based configuration and selection tools:** Tools found online and through applications can provide easy access to must-have information for new engineers. For example, configurators are an easy way to access in-depth product information. They can narrow down and help in selecting the best specifications for a specific product.

Calculation tools are another valuable resource, particularly when sizing specific components. Engineers can fill in knowledge gaps by using tools that easily drag-and-drop into place edits of a product's specifications or they can design circuits such as pneumatic circuits. In fact, the best of these tools are quite simple, often requiring little



□ Hiring an application support team provides the advantage of trained engineers ready to get started on solving complex challenges.

engineering experience to use.

Another excellent resource is online cross-referencing tools. These are valuable because they allow less-experienced team members to find the right replacement parts for legacy equipment for which they have no experience.

**Online resource materials:** Online configuration and selection tools aren't the only web-based resources engineers can use to boost their knowledge base. Many suppliers and outsourcing partners offer resources that can help a team stay up to date on solutions, technologies and trends. Some include:

- White papers or e-books on topics such as deep-dive expertise and insights
- Frequently Asked Question pages that cover helpful answers to common engineering questions
- Case studies that show real-world examples of problem-solving
- Top tip articles like this one

that have specific targeted information

**Training:** Training is the ideal solution when events are occurring slowly enough to adapt. For example, companies can begin to train students through internships or provide training to new engineers as soon as they're hired. In-house, hands-on workshops are an ideal way to give less-experienced engineers the time and space to learn the skills and expertise they'll need in the field. On-demand training tools are also a good way to connect newer team members with the learning they need to ramp up their skills.

The most effective training is a blended approach: before face-to-face training, engineers can take online courses or live virtual courses that encourage an initial transfer of information and create a benchmark for engineers that prepares them for instructor-led courses.

**Outsource to a partner vendor:** Whether a project requires a singular solution such as a single cabinet or a



broader-based solution for an entire greenfield site, there are many levels at which an outsourcing partner can provide value in filling the engineering knowledge gap. A company that already has deep levels of expertise and a track record of success on complex projects can design for a specific application more effectively than an engineer just starting his or her career. Plus, a partnership can allow in-house engineers to provide more value by focusing their time on the areas in which they already have expertise.

A qualified outsourced partner can also help in-house engineers make sense of the influx of data that comes with smart technology. By working with a company able to help the team understand data and how to leverage it into insight, companies can benefit from higher quality and more cost efficiency.

When choosing a full partner, seek an established company with products, services and expertise for the specific industry and application. A company with thorough industry expertise already in place will understand critical factors such as the application and compliance requirements, operating environment and required operational life, the electrical and mechanical characteristics and more.

In addition to the savings that comes from tapping experienced engineering experience, a vendor partner

also can help with anticipating costs beyond components and labor, which are often overlooked on complex systems. The partnership can save overall costs by consolidating purchases, shipments and invoices.

Some companies choose to subcontract only a portion of the project, which can still reduce costs incurred by less-experienced engineers. Predesigned and preassembled components can help decrease spending on subassemblies and components that would otherwise stretch an in-house team beyond their comfort zone. Relying on predesign or preassembly cuts the time and cost of a new engineer spending many hours researching the best match for a specific requirement.

#### ***Application support teams:***

Whether it's the Industrial Internet of Things, functional safety issues or proportional technology, the learning curve for technologies that are new to an engineer can add time and money to any project. Hiring an application support team provides the advantage of trained engineers ready to get started on solving complex challenges. Their support will allow in-house engineers to learn while eliminating common pitfalls before they turn into challenges that increase costs and extend timelines.

Choosing an outside application support team requires looking at the strengths and weaknesses of the

internal team. For example, does the internal team and the application require a support partner that could provide a complete engineering solution for all or just some of the design? Another consideration is whether a partner might be required to make physical visits to provide hands-on support and problem-solving or whether they might just use conference calls or virtual communication channels to connect with the more-experienced engineers of the external partner.

#### **WHICH IS BEST?**

Ultimately, the right solution—or combination of solutions—will depend on numerous factors, from the rate at which the internal team is losing tenured engineers to the scope and timeline of upcoming projects. Another consideration is what capabilities the company already has. For instance, those without the resources to develop or provide training for new engineers might choose a completely outsourced solution that offers a faster return on investment. Overall, understanding the capabilities and specific needs of the company can aid in making the choice that fits best with the internal team's engineers, application and bottom line. **WM**

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☐ By working with a partner able to help the internal team understand data and how to leverage it into insight, a company can benefit from higher quality and more cost efficiency.



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**Admiral Valve LLC dba CPV Manufacturing**

introduced the GSB Valve, a master valve rated for 6,000 psi oxygen and up to 7,800 psi in inert service. The company created 3 GSB versions—2 versions with FNPT end connections ( $\frac{1}{2}$ -inch and  $\frac{3}{4}$ -inch versions) and a union-style valve rated at higher pressures. The valves are soft-seated for bubble-tight shut-off and high flow rates.



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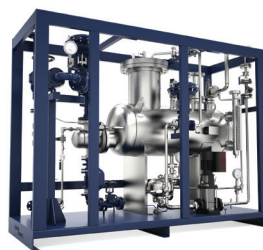
for the AVENTICS G3 Fieldbus platform has key wireless infrastructure that opens the door for digital transformation. The easy-to-use Wireless ARM Clip provides diagnostics and enables commissioning to be done via a mobile website from a Wi-Fi-enabled mobile phone, tablet, or laptop device, regardless of where the valve system is mounted. Ethernet/IP DLR and PROFINET protocols are available initially and additional protocols are available upon request.



**Henry Pratt Company** announced Rotary Cone Valves that help in applications with high velocity and pressure by maintaining constant pressure downstream and regulating flow. The anti-cavitation trim is a new feature that protects the valve when there is a high-pressure differential by modulating the flow to sustain the pressure and prevent cavitation damage. Minimal maintenance is required because of high-strength design, metal seats and long service life.



**Spirax Sarco** has expanded its product line to include the new Clean Steam Generator (CSG) for Healthcare. This product is used to produce sterile steam and reduce the risk of wet packs helping customers resolve a well-known industry problem. It also provides medical facilities with a packaged solution to minimize the risks associated with poor sterilization, allowing them to consistently and reliably meet strict steam quality standards. The quality of steam meets all the latest requirements.



**Valtorc International** has introduced the High Performance All stainless steel flanged ends ANSI Class 150#

solenoid valves, which are normally closed design with zero differential pressure to operate. The Series 800 all-stainless-steel design is for corrosive media applications, and the flanged ends design will fit in most piping applications.



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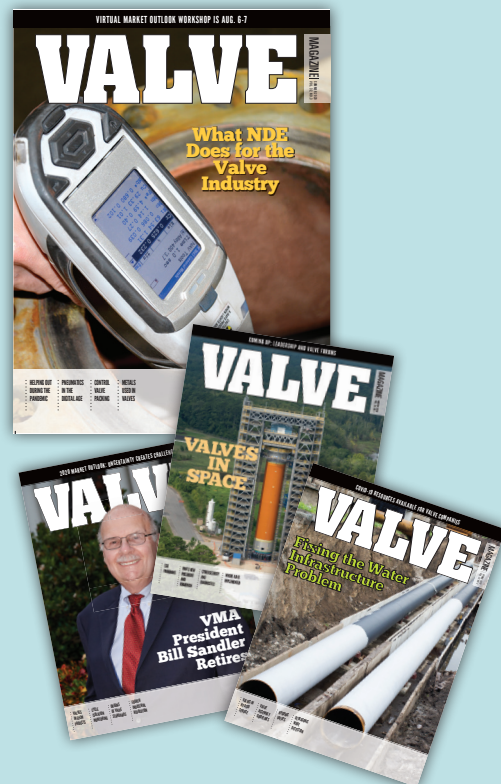
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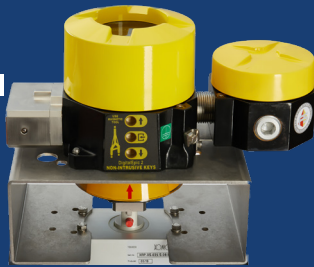
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