

The background of the cover is a photograph of a man, Adam Carlock, standing in a factory or manufacturing environment. He is wearing a dark blue blazer over a dark blue button-down shirt and light-colored trousers. He is holding a large sheet of paper and looking towards the camera. In the background, another worker in a blue shirt and safety glasses is visible, working at a station. The setting is filled with industrial equipment, blue shelving units, and various tools.

**HV
MFG**

THE COUNCIL OF INDUSTRY MAGAZINE

FALL 2018

COMPANY PROFILE
AMETEK ROTRON

EMERGING LEADER
ADAM CARLOCK
SONO-TEK

LEADERSHIP PROFILE
DARREN DOHERTY
PRESIDENT & CEO PACKAGE PAVEMENT

GEARING UP FOR GROWTH

RESOURCE GUIDE INSIDE



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Adam Carlock excited with his role as inventor and electrical engineer at Sono-Tek Corporation located in Milton, NY.

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Cover photo by Tom LeBarbera
Picture This Studios

Nildeep Patel from Ametek ROTRON discusses the advanced cooling systems they provide to the Military and Aerospace Industries.

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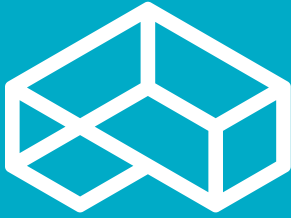
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Harold King
Executive Vice President
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GEARING UP FOR GROWTH

DEAR READER

“We’re paying the bills.”


That is the response I got many years ago from one longtime member of the Council of Industry when I asked him the question I ask every member I visit: “How’s business?” In fact his business was expanding rapidly. They were very profitable, gaining market share and even vertically integrating some of their operation. His humble response was a combination of his natural humility and his sincere desire not to tempt fate. This modesty is also typical of most of our manufacturing members.

Keep that story in mind when I tell you that manufacturers in the Hudson Valley are “paying their bills.” Recent studies and surveys show tremendous optimism and confidence among small business owners and manufactures. Investment in new equipment is higher, wages are higher, and productivity is on the rise. By and large our member firms are growing faster now than they have in decades.

Yet fate can be fickle. It is always lurking around the corner and we are wise not to tempt it to turn. Such a turn might take the form of the skilled labor shortage; or the uncertainties around trade policy; or new and disruptive technologies; or other issues and events that have yet to materialize and which we cannot yet imagine. It is for these reasons that the optimism of manufacturers is tempered by caution, and confidence by a commitment to continuously improve their business and address looming problems.

HV Mfg is all about Hudson Valley manufacturing – who they are, what they make, the challenges and opportunities they face. In this issue of HV Mfg we look at some leaders who are working hard to ensure they are capitalizing on their present growth as well as preparing for the future. **AMETEK Rotron** (company profile) is investing in new equipment and upgrading the skills of their employees to provide the best technology possible to their customers – which include the U.S. Military. Our leader profile is of **Darren Doherty who, as President of Package Pavement Corporation**, has turned that company into a nimble, customer focused producer of material for the construction industry. Our emerging leader is proving that the best path to success is not necessarily the most direct path. From accounting, to cooking, to engineering, **Adam Carlock** has found his calling at Sono-Tek.

In other articles, David King looks at how emerging blockchain technology may become an indispensable tool to manage supply chains. Lara Litchfield-Kimber writes about the **Mid-Hudson Children’s Museum and a new interactive Science Museum** on Poughkeepsie’s waterfront designed to inspire the next generation of manufacturers. Serena Cascarano writes about the value of her **experience as an intern** with several organizations (including with the Council of Industry.) James Irvine introduces us to **Westchester Community College’s CNC training program**.

As always I want to sincerely thank the organizations that support our publication with their advertising dollars. Without them we could not share the news that our members are “paying the bills.” Nor could we pay our own. Thanks too, to Council members Ad Essentials and Maar Printing for helping us to again put together a quality publication. 

BRIEFS

ECONOMY AND JOBS

Manufacturing Job Openings Hit a New All-Time High in July

The Bureau of Labor Statistics reported that manufacturing job openings hit a new all-time high in July. Manufacturers posted 506,000 job openings in July, up from 475,000 in June. That was the highest reading since the Job Openings and Labor Turnover Survey (JOLTS) was introduced in December 2000. In the latest figures, there were more job openings in the nondurable goods sector, up from 182,000 to 214,000, a new record high, but postings for durable goods manufacturers pulled back from 293,000 to 292,000. Overall, these data reflect an ever-tightening labor market, with manufacturing business leaders citing the inability to attract and retain workers being the top challenge cited in the most recent NAM outlook survey.

Along those lines, net hiring has also been robust for manufacturers. There were 393,000 hires in the sector in July, up from 360,000 in June and the strongest reading since February 2007. Hiring accelerated for both durable (up from 207,000 to 236,000) and nondurable (up from 153,000 to 158,000) goods manufacturers in July. At the same time, total separations—including layoffs, quits and retirements—increased from 337,000 to 346,000. As a result, net hiring (or hires minus separations) jumped from 23,000 in June to a very robust 47,000 in July.



U.S. GDP Growth Revised Up in Second Quarter

Economic growth was strong during the second quarter Gross domestic product—the value of all goods and services produced across the economy—rose at a 4.2% annual rate in the second quarter, adjusted for seasonality and inflation, the Commerce Department said Wednesday.

The agency had earlier estimated second-quarter growth at a 4.1% annual rate. Economists surveyed by The Wall Street Journal expected an unchanged reading of 4.1% on Wednesday.

The second-quarter growth rate's revision partly reflected stronger business investment than the earlier forecast and a slight downward revision to consumer spending. The 4.2% rate still marked the strongest pace of growth in nearly four years.

The latest reading on GDP bolsters the likelihood that Federal Reserve officials will raise short-term interest rates at their next scheduled meeting in four weeks' time, September 25-26. Central bank officials have raised rates twice this year, to a range between 1.75% and 2%, and penciled in two more increases in 2018 and three in 2019.



NFIB Survey: US Small-Business Optimism at Record High on Hiring, Spending

A measure of optimism among U.S. small-business owners rose to a record and exceeded projections as companies planned the most capital spending since 2007 and hiring intentions hit an all-time high, a September National Federation of Independent Business survey showed. Small businesses are increasingly optimistic as the economic expansion enters its 10th year and the Trump administration prioritizes industry deregulation and tax cuts. Companies have been boosting inventories to match robust consumer demand for goods and services.

"The small business engine continues to roar with the dramatic change in economic policies since November 2016," survey authors William Dunkelberg and Holly Wade said in the report.

While the gauge of intent to hire reached a record, finding qualified workers remains a problem. Of companies trying to fill a position in the month, 89% reported finding few or no qualified applicants. At the same time, reports of higher compensation were unchanged at a net 32% of firms and plans to raise pay decreased 1 point to a net 21%.



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TRADE

NY Fed Survey: Tariffs and Trade Policy Changes Seen Lifting Prices

Supplementary questions to the August Empire State Manufacturing Survey and Business Leaders Survey focused on the effects of recent changes in trade policies—and specifically tariffs—on businesses in the region. A couple of these questions had been asked in surveys conducted in August 2017 and earlier.

In the current survey, 77 percent of manufacturers indicated that, during the past year, at least some of their revenues had come from foreign customers. On average, manufacturers indicated that nearly 12 percent of revenues had come from foreign customers.

When asked how much, if at all, recent increases in tariffs had raised input costs—either directly or indirectly—68 percent of manufacturers said at least slightly, with 16 percent and 5 percent, respectively, characterizing the increase as substantial. Businesses were also asked how they saw changes in trade policy affecting the prices they paid, their selling prices, and other measures in 2018 and in 2019. For both years, roughly three in four manufacturers saw an upward effect on prices paid, and roughly half saw an upward effect on selling prices.

QUESTION 5 What effect do you see changes in U.S. trade policies having on each of these components of your business in 2018?					
Percentage of Respondents Reporting					
	Significant Downward Effect	Slight Downward Effect	No Effect	Slight Upward Effect	Significant Upward Effect
Empire State Manufacturing Survey					
Prices you pay	1.6	3.2	19.8	49.2	26.2
Selling prices	0.0	6.3	45.2	43.1	6.3
Your sales to foreign customers*	8.4	26.3	55.8	7.4	2.1
Your sales to domestic customers	0.8	15.9	65.9	15.1	2.4
Overall net effect on bottom line	7.1	43.7	36.5	11.9	0.8

QUESTION 6 What effect do you expect them to have on each of these in 2019?					
Percentage of Respondents Reporting					
	Significant Downward Effect	Slight Downward Effect	No Effect	Slight Upward Effect	Significant Upward Effect
Empire State Manufacturing Survey					
Prices you pay	2.3	2.3	23.4	46.1	25.8
Selling prices	0.0	3.9	44.1	44.9	7.1
Your sales to foreign customers*	10.4	24.0	55.2	6.3	4.2
Your sales to domestic customers	2.4	13.4	65.4	14.2	4.7
Overall net effect on bottom line	10.9	32.8	42.2	10.9	3.1

Miscellaneous Tariff Bill Act of 2018 (MTB) Passes House - White House Indicates President Will Sign

On September 4, 2018, the House agreed to Senate amendments made to the Miscellaneous Tariff Bill (MTB) Act of 2018 last month, moving the legislation to the president for signature. The White House reportedly indicated President Trump will sign the bill. The last MTB passed by Congress expired on December 31, 2012.

Once signed into law, the bill would cut or eliminate tariffs on articles such as chemicals, footwear, toasters, and roughly 1,660 other items made outside the United States. Roughly half of those items are produced in China and there is an overlap between MTB and the Section 301 tariffs in effect, and those being considered.

Section 1664 states the effective date is on or after the 30th day after the date of the enactment of the Act. It provides for duty suspensions and reductions through December 31, 2020.

The next MTB petition cycle will be in the Fall of 2019. The purpose of MTB is to reduce or eliminate what many businesses claim are unfair, out-of-date and/or anti-competitive taxes.



The US and Mexico Struck an Agreement on Key Parts of NAFTA

The U.S. and Mexico have reached an agreement on elements of the North American Free Trade Agreement, marking a significant step toward reshaping the landmark trade deal.

Some of the issues that were negotiated:

A US push to increase the percentage of a car that must be sourced from a NAFTA nation to move freely across the borders of the three NAFTA nations. That percentage under the deal would increase to 75% from 62.5%.

A threshold for the amount of manufacturing that must be performed by auto workers making \$16 an hour or more. Under the new agreement, 40% to 45% of the car must be made by these higher-wage workers to move between the NAFTA countries without facing a duty.

The deal would also update rules on intellectual property rights and labor negotiations.

Attention now turns to negotiating with Canada. The U.S. and Canada are trying to reach an agreement by the end of September that would complete a revamped three-nation deal with Mexico that Congress may consider next year.

LABOR AND EMPLOYMENT

Mandatory Sexual Harassment Training Now Required in New York State

New York State will mandate that employers provide employees with annual sexual harassment training. In 2018, employers must provide the training and a written anti-harassment policy to employees starting in October.

The new law requires employers adopt a sexual harassment prevention policy which: (1) prohibits sexual harassment and provides examples of prohibited conduct; (2) includes information concerning federal and state sexual harassment laws and mentions there may be applicable local laws; (3) includes a standard complaint form; (4) includes a procedure for the timely and confidential investigation of complaints including due process for all parties; (5) informs employees of their rights of redress and available forums for adjudicating claims administratively and judicially; (6) clearly states sexual harassment is a form of employee misconduct and that sanctions will be enforced against individuals engaging in sexual harassment and against supervisory management who knowingly allow such behavior to continue; and (7) clearly states retaliation against individuals who complain of sexual harassment or who testify or assist in any proceedings is unlawful.

The policy must be provided to employees in writing. Employers would be wise to include this policy in their orientation package. New York employers should informally and formally routinely remind employees of this policy.



Bill Would Grant 12 Weeks' Paid Bereavement Leave to All New Yorkers

New York could soon become the first state in the nation to require employers to offer up to 12 weeks of paid time off for workers to deal with the death of a family member.

A bill mandating paid bereavement leave passed the state Senate and Assembly in June, expanding the state's paid family leave law that took effect on Jan. 1, 2018. Gov. Andrew Cuomo has indicated he will sign the Bill into Law. If he does employees would be eligible for paid leave after the death of a spouse, domestic partner, child, parent, parent-in-law, grandparent or grandchild. The law would take effect Jan. 1, 2020.

Critics of the bill say it's too generous to employees and unfriendly to business. There are no expiration dates on when bereavement leave should be taken and the law would treat deaths of grandparents and in-laws the same as spouses and children. Supporters say everyone deserves to grieve as they see fit, and there's little incentive for abuse since employees will be paid only 50 to 67 percent of their salary while on leave. The bill sailed through the Legislature with bipartisan support, passing the Senate on June 19 by a vote of 61-1 and the Assembly on June 20 by a vote of 111-32.

The bill's authors -- state Sen. Rich Funke, R-Fairport, and Assembly Majority Leader Joseph Morelle, D-Rochester - experienced the death of a son and daughter who were in their early 30s.

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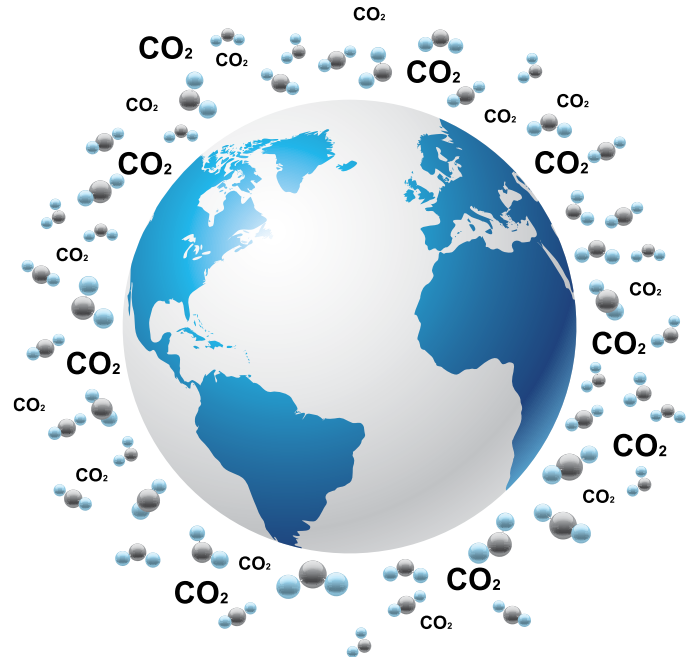
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ENVIRONMENT HEALTH AND SAFETY

Trump Administration to Replace Obama's Clean Power Plan with Weaker Greenhouse Gas Rules for Power Plants



In August the U.S. Environmental Protection Agency (EPA) proposed a new rule to reduce greenhouse gas (GHG) emissions from existing coal-fired electric utility generating units and power plants across the country. This proposal, entitled the Affordable Clean Energy (ACE) Rule, establishes emission guidelines for states to use when developing plans to limit GHG's at their power plants. The ACE Rule replaced the prior administration's Clean Power Plan (CPP). It is intended to empower states, promote energy independence, and facilitate economic growth and job creation.

Pursuant to Executive Order 13873, which directed Federal agencies to review burdensome regulations, the EPA undertook a review of the CPP. Many believed the CPP exceeded EPA's authority under the Clean Air Act, which is why 27 states, 24 trade associations, 37 rural electric co-ops, and three labor unions challenged the rule which the Supreme Court issued an unprecedented stay.

Collaborating With Hudson Valley Manufacturers To Address The Skills Gap



Westchester Community College is Rising to the Challenge

Manufacturing Industry Trends

Manufacturing in the United States has seen a resurgence in recent years helping to drive our strong economy. Reshoring, or bringing back jobs to the U.S., has become an important trend in the industry and positions the U.S. to be more competitive globally. Favorable tax policy and deregulation are propelling increased investments and capital spending in technology. Advances in technology have significantly improved productivity.

Along with this resurgence, particularly the advances in technology and automation, a new challenge has emerged. With unemployment rates at, or near, all-time lows, local manufacturers are feeling the impact of this when it comes to filling many of their open positions. Many local manufacturers have said the shortage of workers is their most pressing issue. The challenge now is the need to develop people with the necessary skills to work in advanced manufacturing. Among the skills needed are machine operators, as well as qualified personnel to create, install, repair, and manage the wide array of equipment and machinery being deployed on the factory floor.

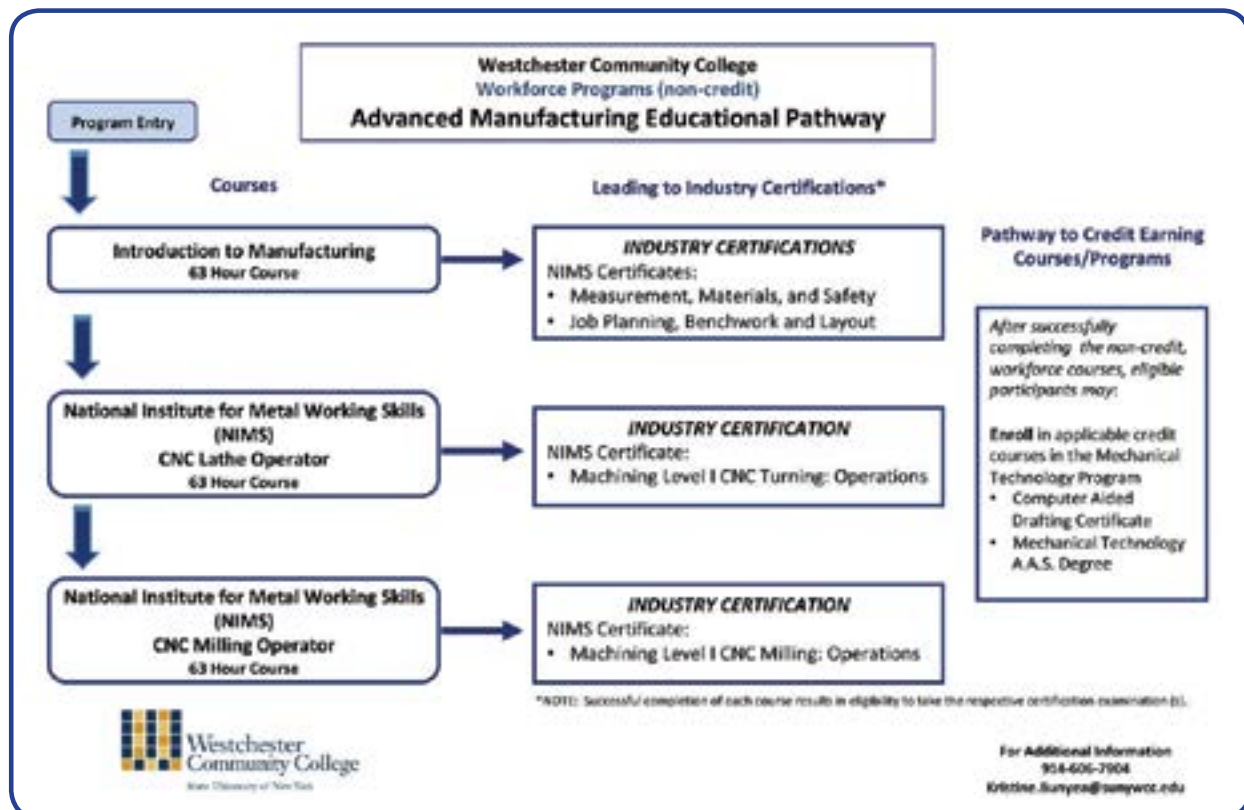
Creating Programs to Meet Industry Needs

Together with input from several local manufacturers, Westchester Community College developed a set of programs to help address the talent shortage occurring in the sector. This focused need is to teach entry-level skills for CNC operators and machinists to meet the demand from employers to keep their businesses running effectively.

Larry Fryer, President of Fryer Machines, an important benefactor to Westchester Community College and an advisory board member shared his comments recently about the industry being overlooked by many of the younger generation. “The perception out there is manufacturing, and machine shops are dirty, they’re old fashioned, something our fathers did,” stated Larry Fryer. “The fact is that

manufacturing has changed, it’s more what I call ‘grey’ collar, so you don’t get as dirty. You work with your head a lot more than you do with your hands. The human machine interface (HMI) in modern manufacturing equipment allows people to interact with machines with ease and efficiency through automation. That has really become a skill that is in need and pays well,” said Fryer.

Creating a career pathway and an entry point into the college was an important consideration when putting together a program to address the needs of local employers. In addition to the existing credit-based CAD Certificate program, a non-credit certificate program aligned with the National Institute for Metalworking Skills (NIMS) was introduced. This comprehensive program includes a strong baseline of “must-have” skills for entry-level workers. Students in these programs undergo rigorous training in OSHA safety requirements and regulations and learn the fundamentals of personal protective equipment (PPE), how to read and interpret Material Safety Data Sheets (MSDS), lock



"The fact is that manufacturing has changed, it's more what I call 'grey' collar, so you don't get as dirty. You work with your head a lot more than you do with your hands . . ."

out, tag out procedures, HMIS labeling systems and NFPA before moving on to working with metals and other advanced skills.

The **NIMS certificate program** is comprised of three separate classes each with 63 hours of classroom hours and hands-on projects leading to four industry certifications. The first in the series is the Introduction to Advanced Manufacturing class and includes two separate certification exams around measurement, materials, safety and project planning, bench work and layout.

Once students have completed the introductory course, two additional classes are offered for students to continue advancing their skills. *Advanced Manufacturing I* introduces students to the milling process where they learn the basics of CNC milling operations and programming. *CNC Milling and Advanced Manufacturing II: CNC Turning* continues on to lathe operations and the turning process.

The **NIMS non-credit program** provides a pathway to Computer Aided Drafting (CAD) and Mechanical Technology credit bearing programs at the college for those who want to continue advancing their career skills in manufacturing. In addition, the college has partnered with The Council of Industry to support their **NYS Registered Apprenticeship Program** and has recently applied to participate in the SUNY Apprenticeship grant. This collaboration has the potential to provide discounted or free related instruction credits to registered apprentices throughout the Hudson Valley.

As manufacturing jobs return to the U.S., they require sophisticated training and capabilities. As a result, demand for highly-skilled labor will increase and companies and government agencies must work collaboratively to bridge the skills gap. Throughout the Hudson Valley Region, a number of resources are available to support the success of our manufacturing business community. These resources include your local One Stop Career Center and many statewide and local initiatives. Westchester Community College, in collaboration with The Council of Industry, the Westchester-Putnam Workforce Investment Board (WIB) and local manufacturers, is leading the way to provide solutions to manufacturing skills gap.

Contact your local Community College or The Council of Industry for more information on this and other workforce development programs in the region.



Jim Irvine is the Director of Corporate Education and Continuing Professional Education at Westchester Community College



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LEADERSHIP PROFILE

Darren Doherty, President and CEO Package Pavement

WITH HAROLD KING

THE COMPLETE PACKAGE



Darren Doherty and Transportation Supervisor, Al Yannone discuss improvements to the loading dock area project.

HV Mfg travelled to Stormville in Southern Dutchess County to visit with Package Pavement President and CEO Darren Doherty. We talked about the Spec Mix® business, managing change and growth, and the challenges of transitioning a family business from one generation to the next.

HV MFG: Thanks for sitting with us today. This magazine is all about manufacturing so tell us - how did you come to be in the manufacturing sector – is it simply because it's the family business?

DD: Actually, yes, that is the simple truth. My grandfather started the business in 1951 and my father took over in the late 50's. In the early 1980s, when I was at Boston College, my grandfather paid me a few visits. He would take me to lunch or to brunch and would tell me that he wanted me to run the company one day. I really did not think much about it at that time. There were dozens of siblings, cousins and uncles who seemed more likely than me to do that and I didn't plan on it ever happening. When I graduated I went to work for Whirlpool Financial in Delaware. We did consumer financing for all kinds of retailers. Any time a customer applied for credit to purchase furniture, or appliances, or any large item, we would provide that financing. I started there in 1986 as a supervisor, then became shift supervisor and later an operations manager. I liked it – it seemed like a solid career path.

In 1990 the controller of Package Pavement retired and my father asked me to come back and fill that role. I was recently married and as I told him at the time – I was not really a numbers guy. But, he said he actually needed someone he could trust – who could gather and interpret all kinds of information – not just numbers. After some thought it seemed like the right thing to do for everybody so I agreed and moved back home.

HV Mfg: Had you worked at the company before – how familiar were you with its operations?

DD: I had worked summers and part time quite a bit – stacking product on pallets, doing some maintenance type work and



Doherty greets new Line Supervisor, John Dowd and Maintenance Manager, John Jasinski.

shoveling a lot of spilled material. Back then it was not really an operation you wanted teenagers around. I had been around enough to get me started and asking the right questions.

HV Mfg: What were some of those questions?

DD: There were plenty of them – “which customers are our most profitable, which products have the best margins” – but the most obvious and important was “we are making money, but how come we never have any cash?”

HV Mfg: Why weren't you?



Doherty and Ravena Plant Supervisor, Fritz Persico review plant batching system.

DD: Well, there were a lot of reasons. We found that a decent percentage of our customers at that time were not paying promptly... if at all. We found that there was a lot of waste in our manufacturing process. We found that we had way too much inventory of some products and not enough of others. We found that we weren't pricing things appropriately for the market. Those were the big things. Around this same time our customer mix changed dramatically – Home Depot and Lowes started to crowd out many of our smaller customers and many of them went bankrupt or out of business.

HV Mfg: Now is probably a good time to ask – what does Package Pavement make?

DD: We make cement and asphalt products that we sell to the construction and building repair industry. That includes direct to commercial contractors but also masonry supply stores, lumber yards, hardware stores and the big box DIY stores. We produce under both our own, private label and under the Quikrete® and



Jerry Guerro, Director of Quality Control prepares a concrete sample for testing on a large concrete pour from an outside contractor.

Spec Mix® brands. The products are cold patch blacktop, all kinds of cement and mortar mixes, sand, gravel – that type of product. We also have a sister company – Red Wing Properties – that not only provides some of the aggregate that we use in our products, but also sells to other construction contractors.

We have a vertical production line. Our raw materials, cements, sand, gravel are combined and mixed at the top and the finished product is put into 60, 80, or 3,000 pound bags at the bottom. From there it goes onto pallets, then trucks and then transported to the customer – either at a job site or a retail establishment.

HV: Mfg: And, in the early 1990's those retail establishments where increasingly Lowes and Home Depot. Was that a good thing or a bad thing for Package Pavement?

DD: It was a bit of both. Home Depot came on the scene in 1989 and our volumes began to grow. Their competition, who were also our customers, lost business to them but we did pretty well – at least in terms of market share. We were able to deliver what they wanted better than other suppliers in the Northeast were able to – so we grew. On the other hand, the pressure to lower our price was constant and ate into our profit – and our margins were not great to begin with.

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A bag of Spec Mix® travels from the packing area to the automated palletizer to be wrapped and shipped to a customer in Brooklyn.

HV Mfg: Did you find the right people?

DD: Definitely – from bottom to top Package Pavement has a great team. I'm going to name a few because they've been here so long and have had such a positive impact. I hope I don't leave anyone out. Ralph Robinson, Operations VP, has been with us for 33 years (he actually has retired but is so key we have him working on special projects for us); Mike Holt – our VP of Sales, has been here for 22 years and Jim King, VP of Construction Products Sales for 23 years; Jerry Guerro, our Director of Quality for 11 years; Mary Lapi-Uresk, our Controller for 27 years; Brett Perkins, our IT guy for 40 years; Tricia Miyoshi for 25 years and my Plant Manager, Cyrus Tompkins, over 35 years.

HV Mfg: They helped you turn things around then? What kind of changes did you make?

HV Mfg: When did you become CEO?

DD: My father retired in 1996 and I was chosen to replace him. My brother Frank became president of our sister company, Red Wing Properties.

HV Mfg: That must have been a little intimidating. You were a pretty young man at that time, correct?

DD: I was 33 and yes, it was more than a little intimidating. But, very early on Carl Dill, owner of one of our local customers Dill's Best, invited me to participate in a CEO roundtable that met every month. It included some really smart, experienced business people: Carl Dill of course, and Roger Smith from Pawling Corporation and others who were a big help to me.

HV Mfg: Can you share an example of some guidance or advice you got from that group?

DD: Sure. When I took over some of the more "seasoned" employees not only didn't like some of the ideas I had for improving the company, but they didn't even take me seriously. We had done things a certain way for such a long time – in the manufacturing process, in sales, in customer service, in finance – that people did not want to change and thought they could ignore me. The advice I got from the group was that I needed to get the right people on the bus. The people who would not follow needed to leave and I needed to find people to implement the changes that needed to be made. I made some tough decisions, fortunately some really key people did want to see the company grow and improve and they embraced the changes. The ones that did not we parted company with.

DD: Definitely – in 1996 we sold off some non-profitable or non-sustainable business segments and added more production capacity. Some of the changes were simple, others more challenging. In 1998 we purchased a property up near Albany and now it's a very significant part of our production capacity. Basically, we have invested in products with higher margins; we have invested in technology and automation and we have increased our customer focus.

HV Mfg: Can you give us some examples?

DD: Sure. One is the plant near Albany in Ravena. We, basically Ralph Robinson, designed a new production line that is very automated and efficient. Another, is our focus on contractors working in New York City. Time and space is at such a premium there that if you can deliver a product when you say you will, in a way that the contractor can use it without having to handle it multiple times, you have a big advantage. We have redesigned our pallets and reconfigured how we pack them to make them easier for those contractors to use. That has won us some business. We have also invested in color matching so that our mortar is accessible to the particular needs of customers – whether that is to match an historical mortar at a university like Yale or West Point – or to provide a consistent color to a unique building. Yankee Stadium, for example, and its recognizable bright white facade is one building we supplied.

HV Mfg: What do you see as your biggest challenge in the next few years?

DD: People, workers at all levels. Entry level, maintenance mechanics, and drivers in particular. It's a tight labor market locally and it is difficult to get people with the right skills and attitude here. Another challenge, though not as pressing – yet, is the availability of raw material. Some of our key ingredients come from Ohio and the Midwest. It's increasingly difficult to get it shipped to us whether by rail or road. I would also add that the constant upward pressure on costs is a challenge. Healthcare costs, the cost of complying with regulations, seem to add up faster and faster.

HV Mfg: What about the opportunities?

DD: I think the eventual – inevitable investment in infrastructure repair will be an opportunity for us. So many bridges need to be repaired. We are well positioned to capitalize on that – especially marine bridge and highway repair – structures that have concrete piers in the water – like the FDR highway and many over water causeways require materials we are able to supply. Also, ongoing construction in New York City. For example some of the 70,000 plus affordable housing units planned for the 5 boroughs are built with concrete blocks which we supply mortar and grout for. We are an integral part of that supply chain. These are very large projects which require hundreds of truckloads of material over their build out.

HV Mfg: You certainly have had a big impact on Package Pavement. How would you describe your leadership style – what makes a good leader?

DD: I guess my style is to be employee and customer focused. I try to follow the FISH! Model which grew out of the Seattle Fish Market 20 or so years ago. It has 4 elements – I'm not sure I'll have them all exact here but they are basically: choose a positive attitude, play and have fun, make someone's day, and be there. I try to do that and I hope the rest of our 170 employees do the same. If we all do that, our customers will be happy and this will be a positive place to work. As far as what makes a good leader – a few things come to mind right away. One is to have a vision and to communicate it effectively. The second is to invest in people and invest in the plant. Third is to find people that “fit” the company – people who understand the vision and want to help you get there. Finally, it really is about the people who work here. If you have people who want to be a part of the company then we really should all be in it

together... like a family. We have 170 employees and that means there are 170 different individuals with their own life situations and problems. As I've gotten older and dealt with my own personal situations I realize that life is complicated and people have problems that may prevent them from being at their best all the time. So we try to be accommodating and patient and supportive where we can.

HV Mfg: We have heard several examples of how you have been patient and supportive – want to share any of those stories?

DD: I don't think that's necessary. I mean we've donated to families in need and grief, and we've given extended leave, and we've helped with other expenses for people...let's just leave it at that.

HV Mfg: Package Pavement has been a Council member for decades – you serve on the Board and were President of the association. What do you find most valuable about membership?

DD: I have really valued being a part of the Board and learning from the other manufacturing CEO's. We take full advantage of the networks, EHS and HR in particular. The energy consortium has been good to us, as has a lot of the training. The Council is really a great resource for a firm our size.

HV Mfg: Thank you very much for your time and sharing your story with our readers.

DD: Thank you, it was fun.



Ravena Plant with cement and lime silos in the background.

NEW YORK'S CLEAN ENERGY STANDARD:

UNDERSTANDING IT'S IMPACT ON COMMERCIAL ELECTRICITY CONSUMERS



entity (LSE) in New York State to procure renewable energy credits (REC's) associated with new renewable energy resources—known as Tier 1—for their retail customers. (Load Serving Entities include all the investor-owned distribution utilities, energy service companies (ESCO's) Community Choice Aggregation programs (CCA's), jurisdictional municipal utilities, and self-supplying customers through NYISO. Micro-grids and CHP generators are not considered to be LSE's). The ZEC requirement mandates the LSE's procure ZEC's from NYSERDA. The number of ZEC's is based on each LSE's proportionate amount of statewide load, or energy demanded, in a given compliance year.

While the name “Zero Emissions,”

New York's Clean Energy Standard (CES) is a comprehensive and ambitious clean energy program. The CES is designed to fight climate change, reduce harmful air pollution, and ensure a diverse and reliable low carbon energy supply for New Yorkers. To help achieve these goals, the CES requires that 50 percent of New York's electricity come from renewable energy sources such as solar and wind by 2030. Phase one of the so called “50 by 30” plan began in 2017. It has not been without controversy or cost.

LSE's ZEC's and REC's

To achieve its ambitious goals the CES creates two mechanisms, the renewable energy standard (RES) and the zero-emissions credit (ZEC) requirement. The RES requires every load serving

entity seems to hint at a renewable-energy requirement of some kind, ZEC's are actually subsidies paid to non-economic nuclear generation plants. Though the State insists they are needed for both environmental and reliability reasons, this ratepayer funded program is controversial for several reasons.

The rationale behind the creation of ZEC's lies in the view that we are in a transitional period of energy generation. It is easy to see that we create less carbon per generated megawatt today than we did even ten years ago and empirically this year-on-year decline is showing no signs of slowing. Additionally, real and significant advances are being made regularly in wind and solar generation

We create less carbon per generated megawatt today than we did ten years ago.

The adoption of ZEC subsidies have been sudden and startling, but ultimately reflect long term changes in how power is generated and served in the region.

technologies. Taken together, it seems natural that we are currently on our way from high-carbon to carbon-neutral generation in the State. Competitive generation markets like natural gas are responsible for eliminating numerous coal-fired power plants thus lowering carbon emissions. However, they also taking their toll on many nuclear facilities, a zero carbon source, thus putting potentially increasing carbon emissions.

The Market Forces

In our system where power prices are set by the marginal cost to produce one more megawatt, subsidized wind and solar generation, which require no input fuels, drives down prices in periods when they are active. As nuclear generation is the only current technology capable of base-load generation in a carbon-free manner, this creates a problem. On one hand, low cost, carbon-free energy is preferable to most people. On the other, the mechanism that initially cut carbon production (competitive markets) is now rendering the bulk of carbonless base-load generation (nuclear) uneconomical. If we believe that we are on an inevitable path of carbon reduction, the thinking by some is to subsidize failing nuclear plants until such a time as they are either unneeded or once again profitable.

Thus ZEC's were created. ZEC's are superficially similar to Renewable Energy Credits (REC's) paid by utilities in many states in that they are assessed based on consumption. However, there are three key differences between ZEC's and REC's. First, ZEC's are assigned, not earned. Second, unlike REC's, there is no market for ZEC's. Lastly, ZEC's serve a closed market while REC's serve an open market.

Traditional renewable portfolio standards work as follows: utilities are told through legislation that they must buy renewable credits equal to a percentage of their load served. They then shop different options for how to get those credits. Utilities are thus rewarded for a) encouraging energy efficiency through cutting demand, and b) adding renewable generation to their energy mix. Additionally, as REC's are sold on an open market, this creates an additional profit stream for investors looking to build out more renewable merchant generation while also keeping REC prices low.

ZEC's work differently. Because their goal is not to incentivize buildout, but rather to provide for a stable income to certain nuclear plants, ZEC's exist in a set number at a set price. Utilities are told how many ZEC's they must purchase based off their proportion to the total load served in the state. So, if Con Edison in New York City serves 30% of the total load for the state, they

must buy 30% of the ZEC's. This money is then distributed directly to certain nuclear plants deemed uneconomic by the legislature.

The Politics

ZEC programs have drawn fire from many quarters. Ratepayers and utilities have, expectedly, objected to the additional costs that will be incurred from the programs. Existing wind and solar operators have objected to the credits on the basis of the name, insisting that they should be included in ZEC programs as they produce zero emissions. Companies owning both non-nuclear and economically operating nuclear generation object to the favoritism being shown to individual plants.

The adoption of ZEC subsidies have been sudden and startling, but ultimately reflect long term changes in how power is generated and served in the region. As more states contemplate creating these programs, they will likely get more, not less, contentious since they represent states picking winners rather than setting priorities.

In 2016, after the Clean Energy Standard passed, four big electricity providers – Con Edison, Orange & Rockland Utilities, National Grid, and Central Hudson Gas & Electric – asked the state's Public Service Commission for permission to add one or two lines to ratepayers' bills that would explain the surcharges being added to cover REC's and ZEC's charges. But the commission rejected the utilities' request, saying that it was important to "maintain general consistency" and "limit customer confusion resulting from the addition of new lines on customers' bills." The agency said that it is "preferable to recover the costs" for the renewable- and nuclear-energy subsidies "through existing supply mechanisms and bill lines."

The Bottom Line

This means that the cost is folded into the supply charge listed on your electricity bill and for most commercial consumers both charges amount to about \$3.50 per Megawatt Hour. That amount is adjusted every Spring. If you get your power from a third party supplier it is included in some way into the price they charge you. If your firm was under contract when the charges began your supplier would likely have added the charge under a contract clause that allows them to alter the price due to regulatory or legislative changes. Going forward customers should expect this charge to be included in any fixed price offer or in the "retail adder" on a variable price offer. Not all suppliers will handle the charges this way, however, some may "pass through" the charges rather than include them in the offer price and customers should be sure they are seeing apples to apples pricing when it comes to ZEC's and REC's (and capacity and line loss and other charges as well).



PURSUING A CAREER WITH PASSION



Adam Carlock Finds a Career in Manufacturing at Sono-Tek

Just off Route 9W in Milton, NY is Sono-Tek Corporation, a manufacturer of cutting edge technology and the industry leader in high performance ultrasonic spray-coating technologies. It is here that Adam Carlock found his calling as an electrical engineer and inventor. He didn't set out on the typical path to become an engineer but his interest in math and science and his passion to invent new technology led him to Sono-Tek.

Adam is from Long Island and originally went to college to learn accounting, but after his first year he realized it just wasn't the right fit for him. He changed course and following his love of cooking became a chef. Adam worked in the restaurant industry as a chef for the next ten years and while he still loves to cook, the lifestyle of a chef was not an easy one, especially for a husband and father. "As a chef I was working late hours and weekends and I was ready for something different. When my wife's career

brought us to the Hudson Valley, at first I thought I would attend the Culinary Institute of America (CIA). Then I decided that a 9-5 job would be a better fit."

At this point he was still planning to go back to college and his love of math and science had him considering different paths in the food industry such as, biology and horticulture in relation to crop development. Finally, it was a class in physics at SUNY Dutchess that really sparked an interest.

While at SUNY Dutchess, Adam took math, science and general engineering courses. Upon completing his Associates Degree, he decided to continue his education at SUNY New Paltz and chose Electrical Engineering as a potential career field. He thought the work was interesting and figured he would be able to get a job at Central Hudson or another local power company upon graduation. Those plans changed after an internship with The Hudson Valley Technology Development Center or HVTDC

(currently the Manufacturing & Technology Enterprise Center -MTEC).

“While working for the HVTDC, my eyes were opened and I saw the other things that electrical engineers could do,” Adam said. He was particularly interested in developing new technology. “I looked at what went into inventing new tech, how to make it and to make it efficiently.”

Manufacturing wasn’t totally new to Adam. While working as a chef he also had a job as a shop foreman in a company that made granite counter tops, so he had experience with CNC (computer numerical controlled) machines and fabrication. After the summer internship with HVTDC where he was in contact with Randy Copeman, the Technology Development Director and Rob Engle, Vice President of Engineering at Sono-Tek, a part-time position opened at Sono-Tek. Randy had been an instructor for one of Adam’s classes at SUNY New Paltz and told him about the opening. This was a golden opportunity with flexible 12-hour work weeks and only three semesters left before graduation. “Working at Sono-Tek while still in college was a great experience because you can really see how projects develop, not just follow a timeline in a classroom setting.” His position became full time once he graduated from SUNY New Paltz with his bachelor’s in electrical engineering degree in 2015.



Alex VanPelt, Engineering Intern, Vaughan Clewis, Mechanical Engineer and Adam Carlock checking the alignment, height, and spring tension on the door and the interlock switch. The interlock switch tells the machine the door is closed. During this check they noticed scratches on the lexan and examined to determine whether replacement of the piece was required.

Part of the Requirement for this BS degree from SUNY New Paltz had Adam complete a Sr. Design project. It was here that Adam actually started his career in inventing. His project, a 3-D printer that created bowls and vessels made of chocolate, received a patent. Interestingly enough, his work on this project took him to the CIA’s special climate-controlled chocolate room where they



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received advice on how to design a climate-controlled chamber for their machine. Dan Freedman, Dean of SUNY New Paltz's School of Science & Engineering called the group working on this project "the three chocolatiers." Yet so far, aside from this project, Adam's food and cooking skills have not yet combined with his inventing and engineering expertise.

Currently Adam is the Jr. Electrical Engineer at Sono-Tek and he explains the advantages of working for a small publicly traded company as, "I'm not stuck in the office all day doing my exact job. I have learned so much about manufacturing in general. I worked with a product engineer for a while and it was eye opening to not only invent the project, but to figure out how someone would build the equipment in the most efficient way. It gave me greater perspective and understanding." Another perk is the flexibility with scheduling, which really helps when you have a family.

The downside is, that while he finds the projects he is working on incredibly interesting, there just aren't enough hours in the day to do all the work he wants to. "Sometimes projects get sidelined or shelved when other things need to get done, especially when we are finishing up the quarter."

Adam explained to us that one of the best parts of his job, in addition to inventing new products, is working on internal projects and making them more efficient. Sono-Tek has recently been reorganizing to make their production processes more lean. Adam has worked on these lean projects, which take into account the number of times someone physically touches a product. He is evaluating whether every person and every touch is necessary, and what steps are required and which ones can be eliminated. He said this process has helped Sono-Tek to become more innovative.



Adam Carlock just completed assembling and wiring the connections for the build station used to make the electronics box and panel. The box holds the electronics for the build and is pressurized to keep the explosive vapors away from any components that could spark. The unit is built to control 3 "slave units".

Becoming lean has helped reduce unnecessary stock and wasted time. The company has also developed its own software for tracking projects and product parts, which has helped with time saving and process simplification.

There are other aspects of being an engineer that are not as exciting, like legacy products. These are products that have been around for a while, work well and are popular so no one wants to change them. Adam just has to support them and replace what needs to keep the machine going. While less exciting, these still bring in a profit and are an important part of his job.

While at SUNY Dutchess, Adam had several mentors that inspired him. Leah Akins, Mark Courtney and physics professor Renee Lathrop. "Professor Lathrop was the first to really open my eyes to what a degree in physics or engineering can really do. She helped me realize how marketable this degree could be and what kind of future I could have." He added that Mark Courtney is a great member of the department at Dutchess and really helps shape the students for what they will see ahead in other engineering schools. At Sono-Tek, Randy Copeman is Adam's direct supervisor and has helped him develop his mindset and his outlook on his career development.

Based on his personal journey, Adam has this advice for young people thinking of a career in manufacturing, "Find what interests you. There are so many fields to choose from, find something you have a passion for." The math required to become an engineer can be difficult for some, but Adam said something he noticed as a math tutor was, if you really want to learn it and you have that passion you would eventually learn it. People that just picked engineering because they thought it sounded good or it was a well-paying field, but did not have that passion, had more of a struggle when the coursework got harder. He also recommends taking math in the senior year of high school, even if it's not required.

Another bit of advice Adam offered, "When looking for a job, especially your first job out of school. Look at the people and the culture, what you make will always be secondary to who you work with every day. The culture can make or break you through the rough times."

Adam doesn't have any concrete plans for the future. He likes inventing and wants to continue to develop himself and see where that takes him. Sono-Tek is an excellent place for that to happen. "The open door to develop both internal and external projects as we diversify our market is leading us in new and exciting directions," Adam explains. "Several projects on the horizon look very promising and have a lot of backing to keep them as a high priority. Working with all the different branches of the company to help make our products easier to produce will give me experience I wouldn't be able to get elsewhere."

"Find something you have a passion for..."



Alison Butler is the Director of Member Programs & Services at the Council of Industry.

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EDUCATION FOR THE FUTURE OF MANUFACTURING

BY LARA LITCHFIELD-KIMBER, EXECUTIVE DIRECTOR, MID-HUDSON CHILDREN'S MUSEUM

Expanding a Museum's Role in Advancing STEM Education

Imagine a museum campus that ignites and inspires the next generation of critical thinkers, problem solvers and innovators – a place where young engineers are nurtured, where citizen scientists are activated and where learners of all ages are catalyzed to take action. Imagine a world-leading “Crucible” – a space where complex conversations and thorny problems are tackled by collaborations between industry, community and academics – inspiring action and igniting passions in young people for pursuing careers in STEM.



**IMAGINE ALL THIS ON
THE POUGHKEEPSIE
WATERFRONT.**

A MUSEUM ON THE RISE

The Mid-Hudson Children's Museum is the only children's museum between New York City and Albany. Since 2012, attendance at the Mid-Hudson Children's Museum (MHCM) has grown significantly from 20,000 to 76,000+ visitors per year. We now welcome families from all eleven counties in the Hudson Valley, western Connecticut, 46 other states and 11 countries.

Attendance at MHCM now far exceeds industry benchmarks for interactive children's museums in terms of expected visitors per square foot, and we are now literally busting at the seams and needing to expand.

But, rather than simply expanding the existing space and cater to our current audience of families with young children ages 0-6, we see a strategic opportunity to significantly expand and diversify our content offerings to encourage families to stay engaged with us longer as their children grow.

AN UNPRECEDENTED OPPORTUNITY

MHCM was recently approved to assume ownership of a piece of property adjacent to our current location on the Poughkeepsie waterfront known as Upper Landing. The property includes two historically significant but vacant buildings. That this property is



being made available to us – at this very time – creates a rare and exciting opportunity as we consider our expansion possibilities. Together with the two buildings and our own site, we have the opportunity to develop a whole new museum campus to benefit our region.

A CONCEPT EMERGES: “THE MUSEUMS AT UPPER LANDING”

MHCM is looking to connect our need to expand our physical space with a growing regional need to advance STEM education. Early visioning sessions with community stake-holder groups inspired us to “think big” with respect to the possibilities, and as a result we are developing an innovative concept to create a vibrant, regionally-focused museum campus featuring four separate small museums nestled into a beautiful riverfront park. Each museum will feature its own unique content and will be developed for a particular audience, but all will be grounded in science, technology, engineering and math education.

OVERVIEW OF PROPOSED MUSEUMS CAMPUS

Mid-Hudson Children’s Museum. MHCM’s main building will continue to serve as the Children’s Museum and as the administrative hub of the Museum Campus. We look to build an addition to accommodate a new exhibit fabrication shop, expanded classroom space and exhibit gallery. MHCM will also develop a new enclosed outdoor early STEM exhibit park. (Target Audience: families with children ages 0-6.)

Waterfront Food Works. The existing pavilion at MHCM will become a museum dedicated to food – its production, consumption, artistry, technologies, careers and social issues. The pavilion will be enhanced with the installation of a commercial kitchen facility to support a new waterfront café and expanded catering and banquet service.

New programmatic space will include a classroom with an instructional demonstration kitchen to host family cooking programs, and an exhibits gallery, which will feature exhibits on all aspects of food, local agriculture, nutrition and food-related STEM careers. This space will also host an expanded year-round farmers market. (Target Audiences: families with children ages 4+; seniors; elementary and middle school groups.)

The Science Center at Upper Landing. Hoffman House in Upper Landing is one of Poughkeepsie’s oldest buildings with a section of it dating back to 1717. In this adaptive reuse project, this building will become an interactive science center, housing exhibits anchored

in the exploration of natural phenomena, with the educational philosophy of the constructivist science centers, which feature open-ended, self-directed, inquiry-based experiences with prolonged engagement as outcomes. The unique floor plan of Hoffman House provides opportunity to create mini-galleries, allowing for a wide range of hands-on experiences and discovery across a range of STEM topics. (Target Audiences: families with children ages 5-12; elementary school groups.)

The Crucible. Reynolds Building in Upper Landing will be transformed into a vibrant “community curated museum” (The Crucible), offering exhibitions and programs that are determined and created by, and tightly connected and relevant to, our regional community. Loosely modeled after the MAH (Museum of Art & History in Santa Cruz, CA), where different constituents from within the community come together and co-create exhibitions and programs about complex topics and/or controversial issues. The Crucible will serve as an innovative convening space where new partnerships and connections are formed among middle and





high-school aged youth, academia, industry, the arts, and the community at large. Content will be produced locally to inspire critical thinking, and will reflect multiple viewpoints, interests and interpretations of emerging science and advances in technology and

their intersection with social and/or ethical considerations (e.g. big data and privacy; food systems and social justice; media and mental health). (Target Audiences: middle and high school aged youth, college students, adults, seniors.)

Upper Landing Park. The Park will continue to be made available for both private and public events, with management by MHCM. With interpretive signage already in place on science topics including water power, transportation, bridge engineering and glass eel migration, it is almost as if this Park was destined to be a gateway to memorable STEM experiences, such as those proposed by the creation of this Museum Campus. (Target audience: general public.)

NEXT STEPS

We are now actively evaluating the property for suitability for development and exploring how the buildings can be restored and re-purposed for maximum impact. Specifically, we are looking to develop plans for separate and distinct “museums” that would provide families age-appropriate experiences designed to grow with their children and families.

Our next round of visioning sessions will be in fall 2018 and winter 2019 as we look to map out museum content and to develop plans that depict each of these new learning spaces.

GETTING INVOLVED

We invite your participation! An exciting and ambitious project such as this will require:

Leadership. We are continuing to strategically grow our board and our planning committees so that we are positioned for success in our museum expansion efforts.

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For more information on this project, I invite you to contact me directly at (845) 471-0589 ext. 19 or LLKimber@mhcm.org.

Lara Litchfield-Kimber earned her B.A. magna cum laude from Amherst College in Biology and her M.S. from Cornell University. Formally trained in the agricultural sciences as a plant pathologist, she left research and teaching to become an entrepreneur, starting Fertile Minds, Inc., an informal science education consulting group. She made the leap to higher education fundraising at Cornell University before joining the science center field in 2004 at the Sciencenter in Ithaca, NY. Ms. Litchfield-Kimber is a distinguished leader in the international science museum field, with a proven track record of transforming and growing museums and programs. She was named a Noyce Leadership Fellow in 2010 at the recommendation of the Association of Science-Technology Centers, and in 2015 was the Athena Leadership Award Recipient for the Hudson Valley. She became the Executive Director of MHCM in September 2012 and has just been elected to the board of the Association of Children's Museums in Washington, DC.



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A HUDSON VALLEY MANUFACTURING SUCCESS STORY

A proud, loyal, and dedicated team.

Tucked away in the idyllic town of Woodstock is a company that manufactures products and systems critical to our country's defense. AMETEK Rotron's Fans, Blowers and Cooling Systems are, and have been critical components in some of the most sophisticated military and aerospace vehicles, programs and installations for more than 60 years. Their products are designed specifically to operate in harsh environments, while delivering effective, efficient and highly reliable cooling solutions. Their fans, blowers and air handling systems are in submarines, jet fighters and tanks in addition to commercial aircraft and even drones.



Nildeep Patel, VP of Operations, addressing the multidisciplinary MRO team in Woodstock.



MRO technician, Carlos, repairing a fan using paperless, state-of-the-art Visual Instructions touchscreen.

Rotron has been in business, providing reliable fans and blowers to the military and aerospace industries, since 1947 when it was founded by J. Constant van Rijn. The company was incorporated as Rotron Manufacturing Company in 1949 and developed a variety of innovative fans and air-movers over the quarter century. In 1976 the company was acquired by EG&G and became known as EG&G Rotron. In 1998 both facilities were purchased by AMETEK, Inc., a leading global manufacturer of electronic instruments and electromechanical devices. The Woodstock plant became known as AMETEK Rotron. Rotron is ISO 9001:2000 and AS9100 Rev D approved, meaning they meet the strictest of the international manufacturing standards. 2017 was their 70th year of operation.

Several of the employees at the Woodstock facility have worked for the company for decades, a handful of them for over 40 years. Barbara Volk, Executive Administrator at AMETEK Rotron, began working there over two years ago and has become one of their loyal and dedicated employees. "They are just a fantastic company to be a part of and the largest employer for this area. There are even some families that work here." She added that, "The company is growing and currently looking for new additions to our workforce."

Rotron's Fans, blowers and thermal management systems are vital to many of the aerospace and defense applications we encounter frequently and especially important for our military. Dr Nildeep Patel, Vice President of Operations at AMETEK Rotron, explained, "Thermal management systems regulate the temperature, not just of people, but crucial electronics, parts and equipment. You can find a Rotron fan in a majority of the submarines in the U.S. fleet. Radar systems rely on the fans to keep sensitive technology cool in hot temperatures and warm in cold temperatures with smart fans that communicate with other systems."

In tanks and armored vehicles Rotron components are critical to the systems that keep the vehicles protected from EMP's (Electromagnetic Pulses) so vehicles in conflict zones do not leave the base without their fans on and working. Often while patrolling through areas local combative persons attach IED's (Intelligent Electronic Devices) to the vehicles. The same system is designed to create an envelope that blocks the EMP (often a signal sent from a remote cell phone) meant to detonate the bomb. As the vehicles

return to the base they are swept (inspected) for these devices and they are removed safely because of the system.

Rotron's fan, blowers and systems are also found on commercial aircraft and military fighter jets where they serve to provide critical thermal conditioning of the avionics or crew cabin space. Some of these products are deemed flight safety critical, without these fully functional, critical functionalities the aircraft may be severely jeopardized.

There are Rotron parts not only on tanks, submarines, jet fighters, and aircraft carriers but on unmanned apparatus as well. Long range missiles have systems onboard to keep the electronics working properly and you can find Rotron fans on UAV's (Unmanned Aerial Vehicles), often referred to as drones. The products are designed to withstand or meet specific environmental specifications. Testing on each part is done to ensure it meets the

specification for shock and vibration, humidity, salt

spray, temperature extremes, EMI, and water resistance. Rotron parts are high quality and highly dependable. Some systems run for 20 plus years before needing any unscheduled repair or overhaul.

Last year photos of a U.S. Military drone that was shot down by insurgents in the Middle East were posted on social media. According to Patel, who viewed the photos, "The drone had been virtually disintegrated except for a Rotron fan that was still intact showing the nameplate stamped with 'Rotron, Woodstock, NY' amongst other manufacturer details" – a real world testament to the superiority of their products.

"When people in the defense and aerospace industry talk about fans, people say Rotron. The name stands for quality and reliability,"



Andrew, one of the Manufacturing Engineers inspecting a production fixture, printed with an in-house 3-D printer.



Operator preparing subassembly for motor windings.

explained Patel. About 65 % of their products are for military applications, with the other 20% used commercially in aerospace by companies such as Boeing, Airbus, Northrup Grumman or Lockheed Martin, just to name a few. The remaining 15% are in other commercial uses like thermal control systems in semi-conductors in Silicon Valley.

“There are projects where the customers insist on Rotron fans – this happens all the time,” says Patel. “Our products are not cheap but they are high quality and they last.” Many parts have a life

requirement of 10 years and often designed and manufactured to last longer. There is actually a live test building at Rotron where fans run non-stop. One has been running for over 20 years. Reliability and quality are just part of the reason companies insist on Rotron. There are over 18,000 different products and close to 3,000 product families simply because customers come to Rotron with a specific need and their engineers and sales representatives work together to invent new products or tweak existing technology to meet those needs.

“Rotron’s business model is that of a solution provider,” explains Patel. “There are three variables that we can work with in each product: mass, volume, or power. Some products are big in size but need to be light weight, some must fit in a small space but be very powerful. There can be certain power limitations we must work with. We specialize in working with our customers to create unique product configurations to address the specific

cooling or warming requirement – not only for the aerodynamics or temperature regulating capability, but also for space claim, weight, noise, power draw and system controls.”

It helps that the majority of AMETEK’s management team have backgrounds in engineering. Patel comes from Space Systems Engineering background with an extensive experience in design and manufacture of critical space and aerospace systems. Before moving to AMETEK Rotron, Patel was Vice President of Engineering for another AMETEK business in London, UK and prior to that



Nildeep Patel, VP of Operations, Tom Hafele Production Manager and Adam Casinelli in one of the two production facilities in Woodstock.

he worked for Airbus Defense and Space in the UK as a Systems Architect for ExoMars - the European Mars Rover, where he was responsible for all the critical mechanisms on the Martian robotic exploration vehicle. Patel is a Mechanical Engineer with a PhD in Space Robotics and an MBA.

Rotron is part of AMETEK, a conglomerate company focused on manufacturing electronic instruments and electromechanical devices with headquarters in the United States and over 220 manufacturing sites worldwide. The president of AMETEK is an engineer and the company is run more like a small business than one with over \$4.0 billion in sales. AMETEK buys niche businesses and invests in them to improve and make them sustainable. They currently have 150 manufacturing facilities in more than 30 countries. AMETEK has never sold a business and their executives are very hands on.

Rotron was purchased by AMETEK in 1998. Patel said, "There is an open culture and the company is more of a flat structure than several tiers of management. AMETEK wants to keep talented people

in the company and will move someone across divisions to promote them and keep them engaged." There is also shared knowledge between business units, which is helpful. There are sister facilities in Long Island, NY and El Cajon, California, where Custom Heat

Exchangers and Subassembly Products are manufactured.

Rotron itself is a growing company, currently with a staff of 235, they are looking to add a full second shift. "We have had great success with our job fairs and hired 19 people in the last two months," says Volk. "In addition to increasing our workforce, there are employees that will be retiring in the next few years and we would like to get people in now to learn from them before they leave."

Ametek Rotron's facility itself is a vertically integrated campus with 121,000 sq. ft.

dedicated to design engineering, rapid prototyping, manufacturing, customer support, program management, product test facilities, quality test, procurement, finance and FAA repair stations. The manufacturing areas include casting, machining, motor winding, balancing, final assembly and testing. The product families produced



A batch of motor windings ready for final assembly.

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CNC operator, Jesse Roy – currently at SUNY Ulster part time, studying for a degree in Mechantronics. Shown here working on a machined fan housing.

here have a high degree of vertical integration and core competencies in the design and manufacture of aerodynamics, electromechanical assemblies, motor drives and liquid vapor cycle cooling systems.

Rotron's workforce is a proud, loyal, and dedicated group. There are several family's that have multiple members employed at the facility. The workforce includes a variety of positions from highly skilled engineers to manufacturing processors, material handlers,

CNC operators, fitters, painters, wiremen and quality testers. They hire high school graduates, college interns, military veterans and a wide variety in between. Anyone interested in working for Rotron can either go to their website to view open positions at www.rottron.com or send in your resume and cover letter to our Human Resource Manager at Marie.Tynan@ametek.com. Job Fairs are posted locally in the news media. Keep an eye out for the next one.

AMETEK Rotron is a Hudson Valley manufacturing success story. Rotron is a solutions company and their products are vital to our country's military and aerospace industry. They are a company that inspires pride and loyalty in their workforce and they are growing. This is one facet of the future of manufacturing in not only New York, but the entire United States, create a high-quality product with excellent customer service and dependability that provides an answer to a consumer need.



Alison Butler is the Director of Member Programs & Services at the Council of Industry.



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INTERNS IN THE WORKPLACE

BY SERENA CASCARANO, COUNCIL OF INDUSTRY

The Intern Experience

A journey begins...

This summer I had the exciting opportunity to work as the HR intern at the Council of Industry. This was my third intern experience and I've gained tremendous value from each organization I worked

at. I graduated from Iona College in May of 2017 with my degree in Marketing, and I recently completed my MBA this July at SUNY New Paltz. Throughout college these internships have allowed me to supplement my education and gain real world experience that I couldn't get in a classroom.

I got my first internship the summer after my junior year of college as a Marketing Intern at PC Public Affairs in Albany. Like many college students, I was eager to complete an internship prior to the start of my senior year. I did a simple search online for marketing and advertising firms in the Albany area, and I checked company websites for information on internship opportunities. I was excited to land my first internship at PC Public Affairs, where I learned how to navigate an office setting and manage professional responsibility. These skills made me more marketable and gave me more confidence when interviewing for future positions.

I got my second internship the following summer as an Account Service Intern at Fingerprint Marketing in Saratoga Springs. Fingerprint is a well-known, respected and accomplished advertising agency with big-name clients, and a reputation for their lively and progressive culture. Shortly after declaring marketing as my major, it became my goal to intern at Fingerprint. I applied for the position in the fall of my senior year on the company website, and I interviewed over winter break. I officially received an offer just before spring break. It was the perfect opportunity to spend the summer between graduating and starting my MBA to gain experience and better myself.

Fingerprint had 8 interns, one from each department within the agency. Outside of assisting our supervisors on various projects, we

were pulled together to form our own team and assigned our own client. As the Account Service Lead on this project I orchestrated all communication between the client and our team, and conducted professional meetings and presentations. In the end we were able to

successfully help our client rebrand their image to better promote their mission. It was a great opportunity to work with a real client and make a genuine difference.

My internship at the Council of Industry was unique for a variety of reasons. First and foremost, I was the Human Resources Intern. Despite having a Bachelor's degree in marketing, and two prior internships in the field of marketing, HR caught my interest while pursuing my MBA. I was fortunate that the Council of Industry was willing to let me explore this different aspect of business. I found the internship by searching various Job Boards including Indeed, Glassdoor, and LinkedIn, which allowed me to easily search for positions in all areas of business.

From day one the Council of Industry was focused on ensuring that the internship was valuable to me. The position was broadened to incorporate aspects of marketing whenever possible, while also maintaining a focus on HR. With Johnnieanne Hansen as my supervisor I was able to develop a better understanding of workforce development and gain experience

using an applicant tracking system.

I was also given a chance to further develop my marketing skills by learning to use applications such as Hootsuite and WordPress, commonly used tools companies utilize to enhance their online presence. In addition to gaining experience with these new programs



"As a young professional at the start of my career I want to explore as many aspects of business as possible . . ."

I was also given control of the Manufacturing Matters Blog and social media platforms. These tasks gave me a chance to explore new areas of marketing that interest me.



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The intimate work environment and collaborative culture at the Council of Industry has provided me with a chance to take on real responsibility. This was certainly not the cliché internship that entailed coffee runs and making copies. I was happy to take on any task sent my way knowing that it would in some way be helpful to the Council of Industry or its members.

I just recently accepted a full-time position at the Council of Industry as the Administrative Marketing Assistant and I couldn't be more thrilled to start my career. I'm excited to become an official member of the team and contribute to the success of the Council of Industry and its members. In this new role I will be taking on more responsibility and gaining experience in marketing, administrative and financial assistance, and social media management. As a young professional at the start of my career I want to explore as many aspects of business as possible, and I'm excited to begin that journey with the incredible people at the Council of Industry.



*Serena Cascarano,
Administrative
Marketing Assistant at
the Council of Industry.*

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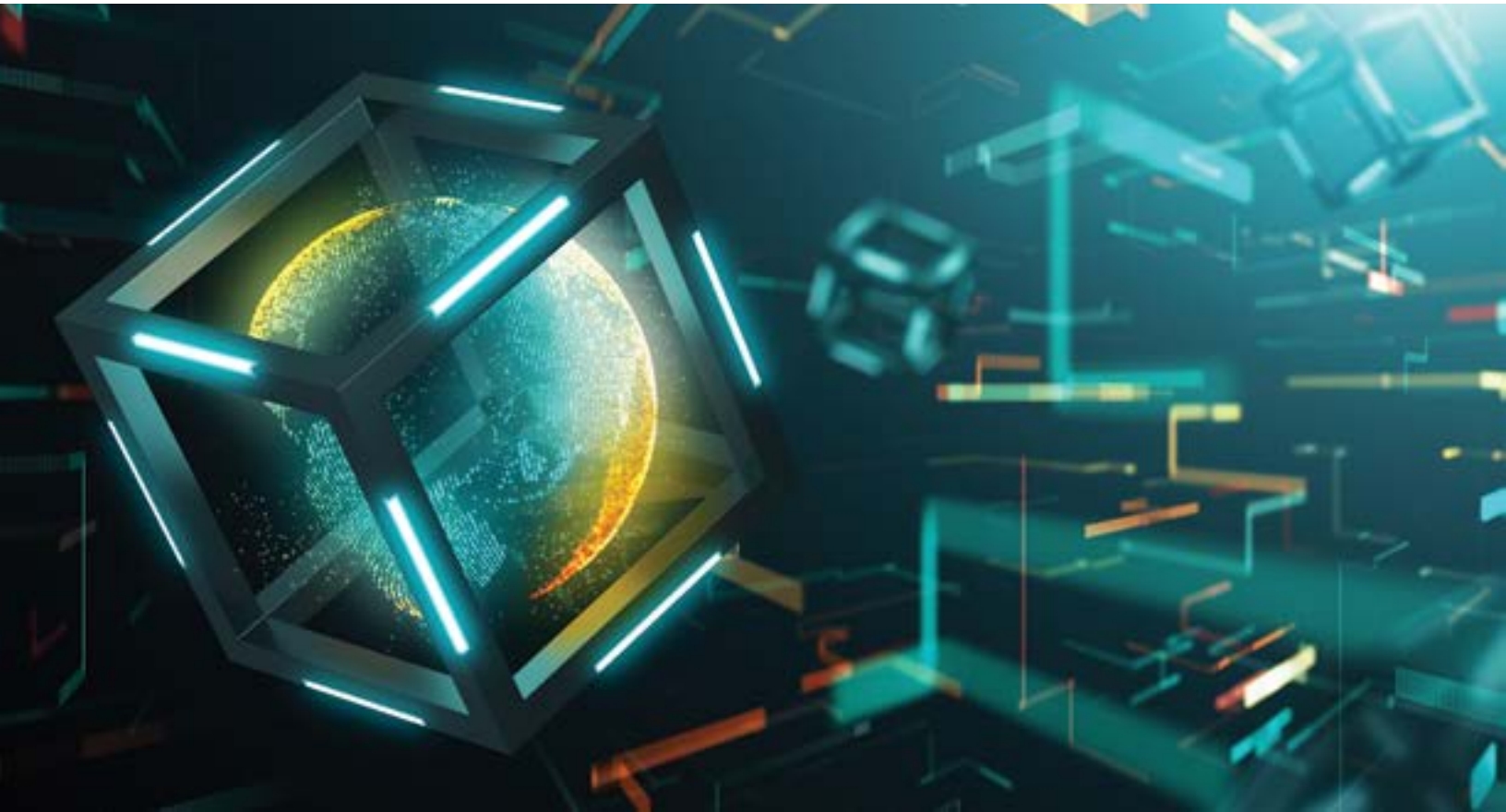
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BLOCKCHAIN AND THE FUTURE OF MANUFACTURING

The technology behind Bitcoin could be a valuable tool for manufacturers.



In the years since this HV Mfg was launched we've aimed to include at least one article every issue spotlighting some burgeoning innovation that could change the industry. Few of them have had as unexpected an origin as this month's subject, Blockchain, which originates from Bitcoin. Yes, you read that right.

So, what is a "blockchain," exactly? And why is a technology developed as a part of Bitcoin—the so-called cryptocurrency—being touted in some corners as a game changer for established industries, including manufacturing?

Simply put, a blockchain is a digital public ledger. It originated as an accounting method for Bitcoin, as a means to verify transactions without relying on a third party. Each block records some or all of the recent transactions. Once completed, a block goes into the blockchain as a permanent database. When a block

gets completed, a new one is generated so there is a potentially infinite number of blocks in a blockchain, connected to each other in chronological order. Everyone connected to the blockchain's can view the most up-to-date transaction history whenever they wish. Every transaction is automatically recorded and cannot be deleted or copied, and nobody outside the network can access it.

Although the technology is primarily used to verify Bitcoin transactions, it is possible to digitize, code and insert practically any document into the blockchain. Doing so creates an indelible record that cannot be changed; furthermore, the record's authenticity can be verified by the entire community using the blockchain instead of a single centralized authority. In the manufacturing industry specifically, there have already been many suggested possibilities for this new technology.

Supply Chain

When several high profile products from BMW and Pfizer suffered shortages late last spring, ordinary consumers were suddenly made aware of how important efficient, durable supply chains are to maintaining their standard of living. The global information technology services company Wipro has posited that this vast, interlocking network of producers, distributors, and their numerous partners is one area where blockchain can have a big impact.

As they exist today, supply chains are elaborate—and somewhat messy—threads of contracts, payments, labeling, sealing and logistics, as well as anti-counterfeit and anti-fraud processes that can span multiple countries around the globe. Such a complicated process often leads to high transactional costs, mismatches, paperwork errors, degradation and theft during transit, as well as contributing to bigger issues such as abusive or unsafe working conditions, environmental damage, illegal production processes, as well as forgery and imitation, all through poor supply chain management.

A blockchain infrastructure could potentially fix these issues by providing an easy way for the distant parties all along the supply chain to register, certify, and track the goods being transferred. All goods would be uniquely identified in the blockchain with a simple barcode, and each transaction would be verified and time-stamped by entering it via the same encrypted, transparent process that Bitcoin proponents use. Every transaction will be open to inspection by other parties on the chain, making it easier to detect problems in advance and pinpoint where and when any delays or other issues originated.

Anti-Counterfeiting

There is currently no reliable way to validate that products and services in a supply chain are legitimate, a fact which has long been a boon to counterfeiters. While the percentage of global trade comprised of counterfeit or pirated goods is small, it can still be dangerous since these illegitimate goods can damage the reputation of genuine businesses linked to them, and pose health and safety risks that the more regulated authentic goods do not carry.



With an anti-counterfeiting blockchain, each product could be entered on the blockchain registry with a unique ID and key attributes. Each supply chain partner would update the status of the item as it traverses from point to point. Products would be validated at each point, from manufacture to sale, with their authenticity checked by matching the key attributes and tracking the ID.

This process would make it easier to spot when goods are stolen or diverted, and provide an easy way to identify the merchandise when it turns up. It would also make it easier to weed out imitation goods by establishing an easy way to check an item's authenticity. It also increases transparency in the supply chain by making it easy to track a good's progress. For example, with this, a manufacturer of engine parts could potentially see not only where their product



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is shipped, but also what it is installed in—a car, a plane, etc.—and where that machine in turn is shipped to. This would make it easier for companies to track how their goods or services are being used, and to ensure they aren't associated with a potential PR controversy or running afoul of government sanctions.

Airworthiness Certificates

In the aerospace industry, parts suppliers must obtain an airworthiness certificate to conform to the quality compliance mandated by authorities. These certificates and their related shipments must be tracked throughout the life of the airplane. Blockchain could be used to securely store the digital assets at every level of the supply chain. Currently such records can only be maintained separately across several different software programs, making it difficult to track and provide a definitive statement on the airworthiness certificate associated with each part of a plane.

In theory, all parties in the entire supply chain would form one private blockchain network where digital assets like FAA form 8130 would be updated and shared across the system. All airline parts could be tracked through the manufacturing lifecycle of the airplane, making it easier to predict and facilitate maintenance and repair of faulty parts. The blockchain would also provide an automatic audit trail, enabling anyone in the chain to track the state of an asset and trace their origins if they prove faulty.

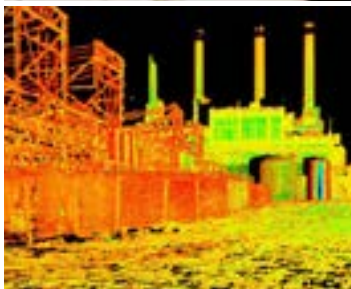
3D Printing

The increasing use of additive manufacturing across production industries requires 3D model files to be shared with 3D printing vendors and their 3D printing machines. Currently they are exchanged with conventional file-sharing methodologies, which means there is a high risk of IP theft. Additionally, tracking the use of the files per contracted quantity is typically done manually, which presents an additional challenge.

A blockchain system would ensure the 3D model files are shared with secure technology, it would also make it easier to identify and verify the 3D printing vendor and 3D printing machines. The blockchain would provide an automatic audit trail, allowing users to track and trace the state of an asset, which also helps prevent IP theft. Additionally, it would maintain easily accessible logs of 3D printing use per contracted quantity.

Potential and Skepticism

The true potential of blockchain is still unknown, and more testing is needed before we can be sure of the technology's real-world potential (and surely its connection with Bitcoin is reason enough for skepticism). Questions have already been raised about storing such a massive amount of data, and skeptics have pointed out that many of blockchain's supposed uses can be done with traditional software. Still, the potential applications are seemingly endless, and it has clearly caught the tech world's imagination. So for better or for worse, it is clear that the technology won't be going away anytime soon. Whether it becomes the next iPhone or Google Glass though, is TBD.



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