Plant

JULY/AUGUST 2021

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CANADA'S MANUFACTURING MAGAZINE

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JULY/AUGUST 2021

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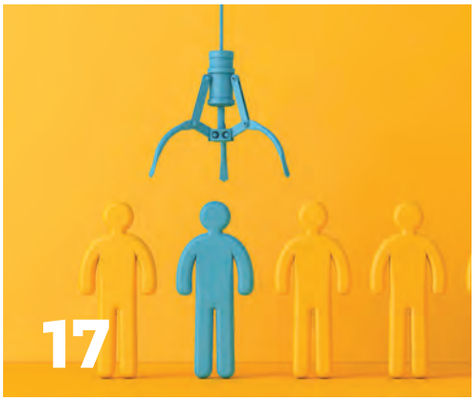

In every issue

EDITORIAL
BY MARIO CYWINSKI

Pandemic impact decreasing

Photo: Funtap / iStock / Getty Images Plus/Getty Images

This year was the first time I had the task of going through the EMC-PLANT Manufacturing Salary Survey. The annual survey of executive salaries is an excellent source of data, and a great view into demographics, salary comparisons, management issues, and more. As someone who has always been interested in statistics, this was definitely an enjoyable task. Moreover, this year marks the 20th year of conducting the salary survey.

Be sure to read the salary survey articles and find out results on pages 8, 14, and 16

This year we expanded the salary survey content to include an article which focuses on women in manufacturing, written by our Associate Editor, Maryam Farag. She took a deep dive to try and help get a better picture of satisfaction levels and salaries of female managers and senior executives in the manufacturing sector across Canada. Our second addition is a question and answer article with survey partner Excellence in Manufacturing Consortium, to get their take on the results, and on the manufacturing industry.

What we found in the data was that while COVID-19 is still very much on everyone's mind, the impact is slowly beginning to wane, which is allowing for cautious optimism to emerge. In all, 68 per cent of survey respondents said that the pandemic did not have an effect on their compensation, with nine per cent saying it had a positive impact, leaving less than a quarter (23 per cent) saying it had a negative impact.

Overall, the average salary for 2021 is $129,685, an increase of 4.8 per cent, year-over-year, compared to the results of the 2020 survey, which had the average national salary at $123,422. As respondents differ year-to-year, if we use what this year's respondents said they earned in 2020 ($125,452), an increase of 3.3 per cent is still observed.

Some interesting findings, the average age of respondents was 53.7, average years in the industry is 25.9, average time in current position was 12.9 years, 45 per cent had a university degree, 44 per cent of companies had less than 50 employees, and 76 per cent of respondents were male.

As part of the survey, we also received feedback comments from the respondents, which we are going through and will post them in an article on our web site. In addition to the articles covering the salary survey, we will also be posting the results, as well as our "gauge your wage" salary calculator.

Plant is also working on its Advanced Manufacturing Outlook Survey 2022, look for it in an upcoming issue.

If you have any questions, comments, or suggestions for any upcoming issues of *Plant*, do not hesitate to contact us. Also, be sure follow us on Twitter, LinkedIn, and Facebook.

Thank you.

MARIO CYWINSKI, EDITOR
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CANADA'S MANUFACTURING MAGAZINE

FACTORY OF THE FUTURE

September / October

Canadian manufacturers lag their global peers in the implementation of technologies, which improve productivity, production efficiency and provide deeper visibility into business operations. As companies recognize the need to adopt "factory of the future" technologies to deal with skills and labour shortages, improve production and provide real-time views of their business, PLANT will identify trends, technology solutions, application of business intelligence and the challenges to implementation and how to address them.

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CYBER SECURITY

November / December

A growing concern among manufacturers is the risk of cyber attacks.

It has become increasingly necessary for manufacturers to implement risk management plans to protect themselves, and to deal with incursions that will come.

Our in-depth report will explore what leading companies are doing to stem the risk of cyber attacks, and deal effectively with them when they do occur.

SPECIAL REPORT IN SEPTEMBER/OCTOBER EDITION.

ADVANCED **MANUFACTURING** OUTLOOK 2022

CANADA'S LARGEST **ANNUAL SURVEY OF MANUFACTURERS.**

SYSPRO salesforce ALBERTA INNOVATES Plant CANADA'S MANUFACTURING MAGAZINE CM CANADIAN MANUFACTURING Insight. Innovation. Impact.

Plant Talk

PODCAST

PLANT TALK DEBUTS, LISTEN NOW!

Plant Talk is a podcast brought to you by Canada's Manufacturing Magazine. It is presented by Plant magazine, Canada's industry voice since 1942 for manufacturing owners, senior executives, administrators and managers who represent all links in the manufacturing decision-making chain.

Tune in to hear conversations with industry experts on comprehensive topics that are of utmost importance to the manufacturing industry.

In this episode, guest Greta Cutulenco, from Acerta Analytics Solutions, speaks with Plant's Associate Editor, Maryam Farag, about the differences between the automotive and tech industries.

LISTEN HERE: www.plant.ca/podcasts/

Ford Mach-E electric vehicle. Photo: Mario Cywinski

AUTOMOTIVE

NISSAN CANADA SENIOR MANAGEMENT CHANGES

Ken Hearn

Trevor Longley

Photos: Nissan Canada.

Nissan Canada has made changes to its management team, effective July 1. Ken Hearn becomes appointed Director of Marketing, succeeding Adam Paterson. Hearn was most recently Director of Dealer Network Development and Customer Quality, which will not be taken over by Trevor Longley, who was most recently Director of Aftersales Operations for Nissan and INFINITI USA.

Hearn has been with Nissan Canada since 2013, and held a number of roles. Hearn will now be responsible for the planning and implementation of all marketing, communications and media for national, retail, digital, customer relationship management, sponsorships and auto shows. He will also lead product planning and day-to-day market actions on Nissan products.

Longley comes back to Canada from his role in the U.S., as he served as director of aftersales and quality assurance for three years at Nissan Canada. He will now be managing the customer quality process, customer experience and product training, and leading development of the dealer network for Nissan Canada.

Both will now report to Milette, and be based out of Nissan Canada's Mississauga offices.

$57.9 MILLION

Total manufacturing sales for May 2021. Year-over-year, total sales saw a 42.6 per cent increase, according to Statistics Canada.

*Visit **plant.ca/news** for more industry news and events.*

ALL NEW LIGHT-DUTY VEHICLES SOLD MUST BE ZERO-EMISSION BY 2035: GOVERNMENT OF CANADA

The Government of Canada announced a mandatory target that all new light-duty cars and passenger trucks sales be zero-emission by 2035, moving up its previous goal of 2040.

Canada will pursue investments and regulations in order to help Canadians and industry transition. It plans to work with partners to develop interim 2025 and 2030 targets, and look at any additional mandatory measures that may be needed. Canada is also partnering with auto manufacturers, which are re-tooling to produce zero-emission vehicles in Canada.

PRODUCTION ACCELERATED FOR BRIGHTDROP EV600

Photo: GM Canada

General Motors will end production of the Chevrolet Equinox at its CAMI Assembly plant in April 2022.

The Ingersoll, Ontario plant will now have an accelerated timetable for converting, and will be able to double the units of the BrightDrop EV600 light commercial vehicle built in its first year of production.

EV600 production will move to CAMI in November 2022 following plant retooling. CAMI BrightDrop production will go to two shifts in 2023 and depending on market conditions, three shifts in 2024. BrightDrop will begin initial production of EV600 later this year. BrightDrop equipment will be moved to Ingersoll after production of the Equinox ends, reducing time for plant changeover.

TRANSIT

ABB POWERS EMISSION-FREE PUBLIC TRANSIT IN ONTARIO

Photo: ABB

ABB installed the traction power substation of the Finch West Light Rail Transit (LRT) project, in collaboration with CYMI, a Grupo ACS company specializing in rail electrification systems.

Finch West LRT project will lower noise pollution, traffic congestion, greenhouse gas emissions and fuel consumption and reduce passenger travel time. According to CodeRed-TO, riders will save over 1/3 in travel time, in just 28 minutes with no transfer, from Humber College to Keele.

The LRT line is owned by Metrolinx. Spanning over 11 kilometres of track, it is set to be completed by 2023, and will move close to 46,000 passengers on weekdays. It will include 16 surface stops, an underground interchange station, and a maintenance and storage facility for the light rail vehicles.

NEWS

GOVERNMENT

FEDDEV ONTARIO INVESTS IN WATERLOO-BASED ADDITIVE MANUFACTURING CONSORTIUM

The Multi-Scale Additive Manufacturing (MSAM) Lab, housed at the University of Waterloo, will establish the Additive Manufacturing Alliance (AMA), with a FedDev Ontario investment of $8.2 million.

Providing access to the MSAM's specialized metal 3D printing equipment and expertise, the AMA will help companies move their technologies from prototype to production-ready.

The project will support over 90 businesses to commercialize nearly 30 advanced manufacturing technologies, create and maintain over 275 jobs and provide training and outreach opportunities for approximately 1,500 students, research associates and industry personnel. It will expand MSAM's geographical reach, with new participating companies from across Southwestern Ontario.

Photo: Canadian Coast Guard

AVIATION

CANADIAN COAST GUARD ANNOUNCES ACCEPTANCE HELICOPTER SIMULATOR

Minister of Fisheries, Oceans and the Canadian Coast Guard, and Mario Pelletier, Commissioner, Canadian Coast Guard, welcomed the delivery and acceptance of a new full-flight helicopter simulator.

Designed and built by CAE Inc. in Montreal, Quebec, the helicopter simulator will be the main training tool for Coast Guard helicopter pilots. Equipped with a roll-on/roll-off cockpit conversion system, the simulator is equipped to provide training on Coast Guard's two different helicopter types, making it a first of its kind in North America.

The simulator will allow Coast Guard helicopter pilots to train for difficult flight conditions experienced, such as inclement weather, missions on top of a mountain, sling load operations, Arctic operations, and search and rescue.

The simulator will be based at the Transport Canada Training Centre at the Ottawa International Airport.

JET IT AND JETCLUB MOVE FORWARD WITH ELECTRIC AIRPLANES

Jet It and JetClub have entered an agreement to launch the all electric, twin turboprop aircraft, eFlyer 800, for Bye Aerospace.

Jet It and JetClub, North Carolina-based sister companies, have signed a purchase agreement for a fleet of eFlyer 800 and four eFlyer 4 aircraft. Slated to be in operation by 2025, the eFlyer seats up to seven passengers and one or two pilots, and boasts cruise speeds of 320 knots, and a ceiling of 35,000 feet.

Cautious optimism

Executive salaries continue to increase, as impact of COVID-19 begins to wane. BY MARIO CYWINSKI

When *Plant magazine* and Excellence in Manufacturing Consortium (EMC) ran their salary survey in 2020, the COVID-19 pandemic was just starting to take hold across the world. It was something many have never experienced, and most were figuring out what will happen and how to adapt, on the fly. Flash forward to 2021, and COVID-19 protocols remain in place across the manufacturing industry. However, there has been market improvement, as the manufacturing sector is leading Canada out of it's recession.

The pandemic was still on everyone's minds when we sent out the call to action for the 2021 EMC-PLANT Manufacturing Salary Survey, from March to May, which marks the 20th year of running the survey. The survey was jointly conducted by EMC, Canada's largest manufacturing consortium, and *Plant magazine*, part of Annex Business Media. In all, 658 company executives and senior management level personnel participated in the survey, with 537 of those completing the entire survey.

COVID-19's IMPACT

In 2020, many companies had to make difficult decisions about operations, including, but not limited to, cutting shifts, laying off employees, temporarily or permanently closing their doors. This year, a larger portion of respondents moved to a new organization (seven per cent), while only three per cent of respondents said they were laid off from the organization they worked for (two per cent company closed down, and one per cent laid off).

Looking deeper, 18 per cent of respondents said that their employment status change was a result of COVID-19. 45 per cent said they had no change in employment status, 34 per cent said their employment status change was not as result of COVID-19, and three per cent were not sure.

COVID-19 EFFECT ON COMPENSATION
Replies 530

Yes, positively 9%

Yes, negatively 23%

No 68%

However, when asked if COVID-19 affected their compensation, almost one quarter (23 per cent) said it had a negative impact, with only nine per cent saying it had a positive impact, and 68 per cent having no impact.

"Employment impacts of COVID-19 on the manufacturers has been sector wide. Nationally, EMC Industry Pulse surveys conducted April 2020 through June 2021 noted initial immediate impacts on workforce levels, correlating with customer sales and system disruptions (shutdowns). Once manufacturing was acknowledged as an essential sector, initial shutdowns and layoffs started to reverse and much work was done to enable industry to adapt workspaces to enable workers to return. This was also noted with StatsCan data," said Scott McNeil-Smith, Vice President, Manufacturing Sector Performance, EMC. "Total employment in manufacturing dropped from 1.7 million to 1.4 million; however, as of May 2021, it returned to 1.744 million. Comparing April 2020 to April 2021, manufacturing employment was actually plus 21.3 per cent year-over-year.

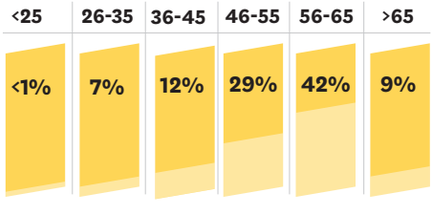
Photo: metamorworks/iStock / Getty Images Plus/Getty Images

Even with all the uncertainty around COVID-19, the average salary for 2021 is $129,685, which is a 4.8 per cent increase, year-over-year.

DEMOGRAPHICS

AGE

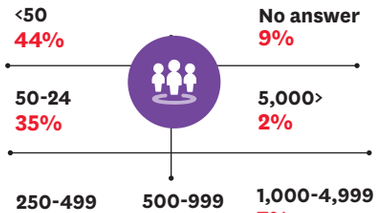
Replies 427 · **Average age 53.7**



Two per cent or less represents a small sample and should be considered with caution.

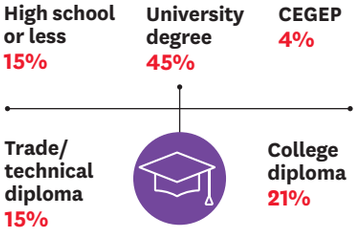
EMPLOYEES

Replies 429 · **Average 431.3**



WHAT IS YOUR HIGHEST LEVEL OF EDUCATION?

Replies 429



WHAT IS YOUR ROLE IN YOUR COMPANY?

Replies 536

REVENUES

Replies 538 · **Average $146.9M**

$1M-<$5M 17%	$5M-<$10M 11%	$10M-<$30M 18%	$30M-<$50M 9%	$50M-<$100M 9%
$100M-$250M 4%	$250M-<$500M 2%	$500M-<$1B 2%	$1B plus 4%	Did not answer 23%

MANAGEMENT ISSUES

MOST SIGNIFICANT ISSUES

Total 535

Skills shortage	55%
Cost control	50%
Capacity utilization	31%
Resource/asset management	24%
Technology upgrade	22%
Forecasting	21%
Supplier relationship management	21%
Reorganization	19%
Risk management	17%
IT issues	16%
Transportation	13%
Environment/Corporate Social Responsibility	11%
Outsourcing	11%
Cybersecurity	10%
Financing for working capital	9%
Overseas sourcing	9%
Global market expansion	8%
Other	6%

WHAT COMPANIES PAY FOR

Replies 453

- 61% Educational courses
- 52% Membership in professional associations
- 48% Professional certification programs
- 25% None of these

Not every industry sector has seen such increases, however return to pre-COVID levels of production appears to be fairly sector-wide."

EXPERIENCE/SKILLS

The manufacturing industry, is getting older, with the average years in the industry now at 25.9 years, up from 25.6 in 2020, and 25.4 in 2019. A majority (55 per cent) of respondents have been in the industry for over 25 years, with another 30 per cent at 10 to 25 years, and only 10 per cent with less than 10 years' experience.

Looking at how long respondents have been in their current jobs, the average time is 12.9 years, up from 12.6 in 2020, and 12 in 2019. In all, 44 per cent have been in their current jobs for less than 10 years, with 36 per cent 10 to 25 years, and 12 per cent over 25 years. In what seems like it's against the grain, years with the current company have actually decreased, for an average of 16.4 years, down from 16.6 the past two years. Years with the current company breaks down to 38 per cent (10 to 25), 33 per cent (less than 10), and 23 per cent (over 25).

MOST IMPORTANT SKILLS

Replies - 461

Management/ Supervisory 57%	Communication 47%	Interpersonal/ Problem Solving 38%	Industry specific technical skills 38%
Productivity/ Continuous improvement (lean etc.) 36%	Project management 29%	Analysis 29%	Planning (forecasting, demand) 27%
Negotiation skills 26%	Financial (budgeting, accounting) 26%	Sales skills 23%	Technical skills (software, programming) 22%

CHANGES NEXT FIVE YEARS

Replies 532

Investing in new production equipment/processes	57%
Hiring new employees	54%
Added/entering new lines of business	34%
Expanding plant size	30%
Enter new lines of business	23%
Enter new geographic markets	20%
Acquiring other companies or lines of business	17%
Merging with another company	13%
Downsizing employees	6%
Downsizing lines of business	5%
Closing of company	4%
Downsizing plant size	4%

PAY PERKS

Replies 468

- Performance or other bonus 40%
- RSP contributions 36%
- Car/gas allowance 30%
- Flex hours 28%
- Travel expenses 28%
- Profit sharing 26%
- Company vehicle 23%
- Pension 21%
- Training, executive development 18%
- Wellness program 11%
- Access to private healthcare 9%
- Stock options 6%
- Club memberships 3%
- Other 3%
- No additional benefits to salary 17%

"Many industries are looking to technology adoption, digitalization, upgrades and other investments to assuage some of the shortfall, as well as reskilling and upskilling their workforce to better tackle higher levels of productivity in demand. Based on our LMI data and focus groups with manufacturers across the country, EMC estimates the industry will need to grow the sector workforce supply by up to 30 per cent (plus the technology additions) to meet future demands on productivity… between now and 2030," said Jean-Pierre Giroux, President, EMC.

That said, the survey found that the top skills that senior managers feel they need more training in are: financial including budgeting and accounting (29 per cent), technical including software and programming (26 per cent), people including interpersonal, relationship, management (25 per cent), industry specific technical skills (23 per cent), and productivity/continuous improvement (23 per cent). Comparing this to the top three skills respondents feel are needed in a job today (management/supervisory at 57 per cent, communication at 47 per cent, and interpersonal/problem solving at 38 per cent), and we can see that what many believe they need more training in are not always the skills that are at the top of the list for what they need to do the job.

Combining the skills gap with the fact that the manufacturing sector has so many different organization types, including: fabricated metal product (17 per cent), misc. manufacturing (nine per cent), plastics and rubber products (seven per cent), wood product (six per cent), food manufacturing (four per cent), paper manufacturing (four per cent), machinery (four per cent), electrical equipment (four per cent), and many others that are at three per cent or less of the overall.

"Some of the causal reasons are the perception of what manufacturing employment entails (not realizing there are over 80 different occupations in the sector), as well as what the paths to a successful career looks like for youth, women, Indigenous, newcomers, persons with disabilities and racialized communities. Providing opportunities and support to these communities/groups is helping to expand that workforce audience and provide opportunities," said Giroux.

SALARIES INCH HIGHER

When *Plant*/EMC conducted the survey in 2020, the average national salary was $123,422, with some provinces being higher, and some lower. With all the uncertainty around COVID-19 in the time since, the average salary for 2021 is $129,685, which is a 4.8 per cent increase, year-over-year. If we use what this year's respondents said they earned in 2020 ($125,452), that is still a 3.3 per cent increase, which is above the traditional rate of inflation.

SALARY COMPARISONS

GENDER

Replies 452

Male
$137,779
(76 %)

Female
$85,112
(13 %)

BONUSES AND INCENTIVES

Replies 452 · No response from 3.5%

44%	0% $103,907	5%	11 → 15% $145,044
8%	1 → 3% $104,590	6%	16 → 20% $162,172
7%	4 → 5% $109,813	19%	20+% $206,139
14%	6 → 10% $126,619		

JOB TITLE

Replies: 452

JOB TITLE	2021	2020	2019	%
Administrative Management	$107,823	$105,947	$109,047	11%
Maintenance Manager	$127,645	$121,680	$116,720	4%
CEO/ President	$166,824	$159,586	$171,371	9%
Plant Engineering	$118,326	$121,789	$119,187	4%
Materials Manager	$82,000	$84,000	$81,000	1%
Owner/ partner	$141,435	$131,095	$135,245	11%
Director	$153,769	$149,278	$135,645	10%
Design Engineering	$108,392	$105,492	$106,825	5%
Quality Assurance Manager	$93,165	$91,363	$87,960	5%
Vicepresident	$191,617	$194,127	$169,107	7%
Technician/ Technologist	$89,330	$87,380	$86,904	2%
Safety manager	$93,286	$94,143	$93,571	2%
Plant Manager	$147,064	$141,587	$133,658	10%
Purchasing/ Supply Manager	$96,527	$95,832	$93,386	5%
Production/ Operations Manager	$106,107	$98,913	$100,593	12%
Logistics Manager	$117,500	$110,500	$101,000	0%
Average	**$129,685**	**$125,452**	**$123,204**	

No response from 1%. Two percent or less represents a small sample and should be considered with caution.

REVENUE

Replies: 452

REVENUE	2021	2020	2019	%
$1M → <$5M	$88,017	$87,153	$92,798	20%
$5M → <$10M	$132,325	$126,392	$120,067	13%
$10M → <$30M	$130,014	$126,346	$126,273	20%
$30M → <$50M	$135,820	$131,240	$127,877	10%
$50M → <$100M	$164,443	$166,549	$152,891	10%
$100M → <$250M	$186,327	$178,655	$161,595	5%
$250M → <$500M	$127,906	$125,352	$116,133	3%
$500M → < $1B	$173,892	$163,738	$157,408	3%
$1B plus	$151,326	$142,221	$142,474	4%
Did not Answer	$118,774	$108,984	$113,056	12%

No response from 12%. Two percent or less represents a small sample and should be considered with caution.

SALARY COMPARISONS

INDUSTRY

Replies: 452

INDUSTRY	2021	2020	2019	% replies
Aerospace product and parts	$118,075	$106,575	$107,218	3%
Chemical	$130,362	$120,162	$120,408	3%
Computer and electronic product	$141,889	$129,333	$118,111	2%
Durable goods industries	$118,486	$116,043	$108,643	2%
Electrical equipment, appliance and component	$133,396	$128,548	$121,778	5%
Environmental	$134,625	$118,450	$116,550	1%
Fabricated metal product	$119,713	$116,596	$117,411	20%
Food manufacturing	$165,617	$167,344	$160,225	4%
Furniture and related product	$105,000	$95,000	$86,875	1%
Machinery	$109,195	$109,276	$109,402	5%
Miscellaneous manufacturing	$131,421	$127,021	$126,248	10%
Motor vehicle	$146,167	$142,778	$137,778	2%
Motor vehicle parts	$157,291	$156,455	$142,059	2%
Non-durable goods industries	$120,333	$120,667	$110,967	1%
Paper manufacturing	$130,026	$124,673	$125,917	4%
Petroleum and coal product	$146,556	$152,667	$174,111	2%
Plastics and rubber products	$138,809	$144,791	$128,374	8%
Primary metal	$197,000	$194,600	$185,700	1%
Printing and related support activities	$112,273	$110,607	$118,773	3%
Transportation equipment	$166,000	$148,167	$133,167	1%
Wood product	$134,653	$122,827	$116,210	7%

Industries with less than one per cent responses, not listed.

EDUCATION

Replies: 452

EDUCATION	2021	2020	2019	%
University degree	$148,000	$143,813	$140,015	41%
CEGEP	$108,500	$103,000	$101,813	4%
College diploma	$117,577	$114,937	$111,448	19%
Trade/technical diploma	$122,726	$115,882	$120,259	13%
High school or less	$104,710	$105,762	$98,379	14%

No response from nine per cent.

YEARS OF EXPERIENCE

Replies: 452

EDUCATION	2021	2020	2019	%
1 to 4	$93,232	$94,157	$91,064	3%
5 to 9	$104,263	$99,627	$98,100	7%
10 to 14	$104,894	$94,939	$92,103	7%
15 to 19	$121,903	$114,532	$120,666	8%
20 to 24	$118,793	$117,263	$111,516	13%
25 to 35	$147,777	$141,216	$138,635	36%
36+	$138,047	$137,556	$132,750	21%

No response from two per cent. Two percent or less represents a small sample and should be considered with caution.

AGE

Replies: 452

AGE	2021	2020	2019	%
Under 25	$66,000	$66,000	$66,000	<1%
26 - 35	$92,277	$86,150	$81,653	7%
36 - 45	$125,344	$118,826	$118,009	11%
46 - 55	$130,056	$125,998	$121,975	26%
56 - 65	$138,314	$136,517	$133,444	39%
Over 65	$129,737	$125,651	$125,424	8%
36+	$138,047	$137,556	$132,750	21%

No response from 10 per cent. Two per cent or less represents a small sample and should be considered with caution.

Looking at only 2021 responses, increases are seen across almost every statistical category. All education levels, apart from high school or less, saw an increase, both genders saw an increase, all provinces apart from Manitoba increased, all age groups, and all levels of job experience, apart from one to four years, went up. In turn, while most job titles saw an increase, a handful did have a slight decrease.

According to EMC's ManufacturingGPS, the percentage of wage increase for all occupations in the manufacturing sector for 2020-21 (September 2020 to March 2021) was:

- 25 per cent - no change
- 25 per cent - 1 to 1.9 per cent increase
- 28 per cent - 2 to 2.9 per cent increase
- 9 per cent - 3 to 3.9 per cent increase
- 13 per cent - over four per cent increase

It seems that the majority of respondents see that salaries are on the rise, as 72 per cent believe that over the next three years their salary will increase, with 35 per cent seeing a one to three per cent increase, 19 per cent a three to five per cent increase, 10 per cent a five to 10 per cent increase, and seven per cent seeing an increase over 10 per cent. On the flip side, 26 per cent don't see any change to their salary in the next three years, and three per cent think their salary will decrease.

While a competitive salary and job security are two of the main aspects of job satisfaction, it is not a be all and end all. Survey respondents rated a healthy work/life balance as the most important aspect of job satisfaction again this year (at 98 per cent), followed by competitive salary (96 per cent), vacation time (93 per cent), comprehensive benefits package (92 per cent), job security (90 per cent), and support for career/professional development (84 per cent).

Those aspects are what employees want; to have the highest job satisfaction. However, how does it work out in practice? When asked how satisfied respondents were with different aspects of their job,

we found that while the numbers were high, there was still some room for improvement. Overall job satisfaction was high (91 per cent), as was job security (90 per cent), vacation time (87 per cent), compensation (85 per cent), benefits (81 per cent), and support received for career/professional development (76 per cent). Interestingly, the most important aspect of job satisfaction, a healthy work/life balance, had only 81 per cent of respondents satisfied.

COMPANY PERSPECTIVE

While salaries are slightly higher, and the majority of respondents reporting that their employment status has not changed as a result of COVID-19, the picture for companies is a little more complicated. Many had indicated additional responsibilities and work load as a result of COVID-19. When asked if their company's revenue has increased, decreased, or stayed the same compared to last year, 35 per cent said it has decreased, 18 per cent said it stayed the same, and under half (47 per cent) saying it has increased.

However, when asked how the revenues looked compared to 2018 or 2017, 55 and 57 per cent of respondents, respectively, said that revenues have increased. Therefore, while this year things aren't as rosy compared to two or three years ago, manufacturing employment is 5.6 per cent ahead, year-over-year, and sales are at their highest levels since June 2019, with 43.4 per cent increase over May 2020.

With a light at the end of the COVID-19 tunnel visible, many companies have redefined what their normal looks like. When asked what are some of the most significant issues that their company will face in the coming year, many of the usual suspects were at the top of the list. They included; skill shortage (55 per cent), cost control (50 per cent), capacity utilization (31 per cent), resource/asset management (24 per cent), technology update (22 per cent), forecasting (21 per cent), supplier relationship management (21 per cent), and down from there.

Respondents seemed to have a positive outlook for what their companies will need to change in the next five years. With investing, hiring adding, expanding, acquiring, and entering new business, as some of the top changes coming. Specifically, investing in new production equipment/processes was on top with 57 per cent, hiring new employees (54 per cent), expending plant size (30 per cent), entering new geographic markets (20 per cent), and combined adding or entering new lines of business was at 45 per cent.

"In general there are three areas requiring investment, in balance with business objectives and operational maturity: **people** (workforce investments such as engagement, recruiting, onboarding, upskilling and reskilling, culture, leadership); **plant** (physical equipment maintenance and upgrades, technology adoption, cost control, building envelope, decarbonization/footprint); and **process** (continuous improvement, process maturity, process automation, advanced manufacturing processes (digitalization), industry 4.0 and AI)," said Giroux. "Investing in these three areas are critical to manufacturing success."

Research Methodology

Research was conducted online between March and May 2021 among 658 Canadian Manufacturing leaders in partnership with Excellence in Manufacturing Consortium. Results were prepared by the Canadian research firm RKI www.rkinsight.com.

Mario Cywinski *is the Editor of Plant magazine, Machinery and Equipment MRO magazine and Food and Beverage magazine, a member of the Automobile Journalists Association of Canada, and a judge for Canadian Truck King Challenge. He has over 13 years of editorial experience; over three years of maintenance, reliability, and operations experience; over 16 years of automobile industry experience, as well as small business industry experience.*

FOCUS: Women in manufacturing

Women in the manufacturing industry responded to the 2021 Manufacturing Management Salary Survey, conducted on behalf of PLANT magazine, and the Excellence in Manufacturing Consortium (EMC), helping to get a better picture of satisfaction levels and salaries of female managers and senior executives in the manufacturing sector across Canada. **BY MARYAM FARAG**

Women represent one of the largest pools of untapped talent for manufacturers, and closing the manufacturing's gender gap is the key to closing the skills gap that has limited businesses' ability to evolve and expand. Not to mention that research shows that gender diversity benefits manufacturing firms by creating a culture that improves their ability to innovate and grow.

In this survey, the number of female respondents is significantly lower than males; 16 per cent vs 84 per cent male.

According to the survey results, 95 per cent of female respondents stated they are working for a full-time manufacturing organization. Two per cent stated they are 25 years of age or under; nine per cent stated they are 26 to 36; 20 per cent stated they are 36 to 45; 35 per cent are 46 to 55; and 30 per cent are 55 to 65.

Women in manufacturing overall are younger than men with 31 per cent under 45 years old. This compares to 18 per cent of men; 66 per cent of women versus 44 per cent of men are under 55.

Let's start by the main theme of this survey:

SALARY

Gross salary

Of the female respondents, 36 per cent said their gross salary is $75K or less; 43 per cent said it is $75 to $110K; and 21 per cent said they make over $110K, meaning the average gross salary is $85,112.

Salary projection

Seventy per cent said they expect an increase in their salaries in the next three years. Breaking it down, 38 per cent project a one-to-three-per cent increase; 14 per cent a three-to-five-per cent increase; 13 per cent a five-to-10 per cent increase, and six per cent an over 10 per cent increase.

Two per cent of the respondents project a decrease in their salaries in the next three years. And 28 per cent said there would be no change.

The following data indicates additional benefits to their salary:

Any additional benefits to salary	**78** per cent
Performance or other bonus	**34** per cent
Flex hours	**34** per cent
RSP contributions	**26** per cent
Training, executive development	**25** per cent
Travel expenses	**23** per cent
Profit sharing	**22** per cent
Pension	**20** per cent
Car/gas allowance	**18** per cent
Company vehicle	**8** per cent
Other	**8** per cent
Access to private healthcare	**6** per cent
Wellness program	**5** per cent
Stock options	**3** per cent
Club memberships	**2** per cent

EDUCATION

Type of degree

A total of 37 per cent of females said they received a bachelor degree, nine per cent other masters, two per cent an MBA, two per cent a professional degree (medical, law) and seven per cent a Ph.D. However, 43 per cent stated otherwise.

Highest level of education

Only 17 per cent of females stated that high school or lower was their highest level of education, five per cent a trade/technical diploma, 38 per cent a college diploma, two per cent a CEDGEP, and 39 per cent a university degree.

Photo: © dusanpetkovic1 / Adobe Stock

COVID-19 IMPACT

There is no doubt that COVID-19 altered employment situations, statuses, and compensations in the past year. However, 42 per cent of the female respondents stated there was no change in their employment situation in the past year, and none changed jobs within the same organization. Further, 32 per cent were in the same job with the same salary, but with increased responsibility due to reduced staff. And nine per cent moved to a new organization.

Six per cent had their hours reduced, six per cent were promoted, two per cent were laid off because the company closed down, and two per cent started new job sharing. Three per cent were given a new role because their old position at the company was eliminated, and three per cent were laid off from the organization. Eight per cent stated otherwise.

Of respondents, 26 per cent of females stated the change in their employment status was because of COVID-19; 25 per cent said it was not because of COVID-19, three per cent were not sure, and

46 per cent had no change in their employment status.

Of females, 33 per cent stated that COVID-19 affected their compensation. Three per cent positively, 30 per cent negatively; 67 per cent stated their compensation wasn't affected by COVID-19.

EMPLOYMENT SITUATION

Role in company

Nearly three-quarters (73 per cent) of females stated they have a management role in the company only, five per cent have controlling ownership stake in the company and a management role, six per cent have an equal partnership stake in the company and a management role, three per cent have a minority ownership stake in the company and a management role. And 14 per cent stated otherwise.

Title

Thirty per cent of females stated that "administrative management" best approximates their title/role. Followed by production/operations manager (12 per cent), director (nine per cent), quality assurance manager (nine per cent), vice-president (five per cent), owner/partner (six per cent), safety manager (six per cent) and CEO/president (six per cent).

EXPERIENCE

Experience-wise, 18 per cent of females said they have 10-or-less years of experience, 45 per cent have 10-25 years, and 30 per cent have over 25+ years, the average years of experience is 20.1.

On a closer scope, 39 per cent have 10-or-less years of experience in their current company; 35 per cent have 10-25 years, and 18 per cent have over 18 years, with average years of experience in their current companies at 14.

In addition, 53 per cent stated they have 10-or-less years of experience in their current job; 29 per cent have 10 to 25, and eight per cent said over 25.

WORK TYPE

According to the survey, the average percentage of hours worked per week by the female respondents is 44.8. The following data shows the type of organization they work for, based on the major products or services at the location:

- Fabricated metal product (17 per cent)
- Miscellaneous manufacturing (15 per cent)
- Plastics and rubber products (eight per cent)
- Wood product (eight per cent)
- Paper manufacturing (eight per cent)
- Food manufacturing (six per cent)
- Aerospace product and parts (six per cent)
- Chemical (six per cent)
- Motor vehicle parts (five per cent)
- Durable goods industries (five per cent)
- Electrical equipment (three per cent)
- Furniture and related product (three per cent)
- Machinery (two per cent)
- Petroleum and coal product (two per cent)
- Beverage and tobacco product (two per cent)
- Clothing manufacturing (two per cent)
- Leather and allied product (two per cent)
- Life Sciences (two per cent)

Therefore, bridging the divide will mean reshaping the way people think about jobs in manufacturing, educating them to the types of jobs that are available and helping them get the qualifications necessary to fill them. Put simply, the manufacturing industry is in a state of reinvention, and educating and empowering women will be critical to the future of the industry.

Maryam Farag *is the Associate Editor of Machinery and Equipment MRO magazine, Food and Beverage magazine, and Plant Magazine, Annex Business Media. Reach her at mfarag@annexbusinessmedia.com*

SALARY SURVEY – EMC's TAKE

Plant Magazine sat down with Jean-Pierre Giroux, President, and Scott McNeil-Smith, Vice-President, Manufacturing Sector Performance, from survey partner Excellence in Manufacturing Consortium (EMC), to get their take on the manufacturing industry and the salary survey results. **BY MARIO CYWINSKI**

***PLANT:* Can you comment to on how COVID-19 has affected employment and compensation in the manufacturing space.**

EMC: As the traditional plant management issues were still present in their businesses (skills shortages, cost control, capacity utilization, resource management and technology upgrades), strategies for managing recovery while addressing these issues were/are paramount. In many cases, manufacturers found themselves competing for limited workers willing to return to work, as well as attracting and re-engaging workers who were furloughed and/or on emergency COVID-19 benefits. While a vital resource that was essential to the Canadian economy, many opted to remain on benefits rather than return to work – compounding the skills and labour shortages.

Compensation, as a result, is a key part of the strategy for recruiting and maintaining workforce levels. At the management level – especially senior management – wage levels weren't as much of an issue as the workload, expectations and other demands on management to 'pick-up the slack' and fill the gaps left by vacancies (whether COVID-19 related or not), and in many cases while having to work from home periodically, during provincial orders.

***PLANT:* The average years of experience and average age of survey respondents continues to go up (25.9 years this year). Do you attribute this to an aging work force?**

EMC: Yes – and this survey represents management respondents. As a sector-wide issue, one of the critical factors affecting manufacturing from a skills and labour shortage, vacancy and productivity/capacity perspective, is the aging workforce. EMC's most recent ManufacturingGPS Employer Labour Market studies show that 1/5 of the manufacturing workforce in Canada is eligible to retire in the next 10 years. Replacing 20 per cent of the workforce with equally skilled and experienced talent will be a monumental challenge. On top of this, manufacturing is currently operating at 80.1 per cent capacity utilization, with over 52,000 published jobs currently vacant and over 200,000 industry jobs that have gone unfilled in the past two years.

***PLANT:* Skill shortage is again the most significant issue facing companies. What do you attribute this to?**

EMC: Two simple answers:

1) Shortage of skills/skillsets in demand by manufacturers; and
2) Shortage of available workers with any skillset, ready and willing to fill vacancies.

However, both require more complex and customized solutions, which EMC is working extensively to solve.

First, EMC has developed and deployed industry-driven skills training programs, including certification and micro-credential training (the most comprehensive suite of industry-vetted learning available to manufacturers). This is currently being deployed – some of which is supported by federal or provincial funding to offset manufacturing costs. EMC's hybrid approach to upskilling and reskilling (customized learning deployed via custom methods – in-class or online, or asynchronous (self-directed)) or professional-instructor delivered, analog and digital, all supported by workplace action/performance projects. EMC has trained tens of thousands of manufacturing workers, with industry recognized credentials, certifications and skills in hundreds of topic areas.

Second, EMC is one of the national sector leaders in assisting manufacturers with connecting to job-ready candidates, through our program called WILWorks, which is providing connections between industry employers and post-secondary students. This provides job placements with work integrated learning. We are also piloting a high school version of this program, as well as connecting industry employment and career-path opportunities to work-ready graduates and displaced workers.

***PLANT:* The percentage of females in the industry is on the rise. What do you attribute this to, and how can it keep going?**

EMC: As opportunities continue to be presented, we will see a continued rise in all under-represented demographics to closely match the population more. The perception of industry employment is changing, and as the message spreads, the interest in women and other groups will continue to grow.

Removing the negative perceptions at a younger age (engaging and raising manufacturing awareness at a younger age), providing skills and experiential opportunities in trades, science, technology, engineering and math fields, and workplace exposure has helped move this.

According to EMC's ManufacturingGPS, the percentage of women in manufacturing workforce was 26 per cent in 2017 and 27 per cent in 2020-21, based on 1.7 million employees, which is an increase of about 18,000 women.

Mario Cywinski *is the Editor of Plant magazine, Machinery and Equipment MRO magazine and Food and Beverage magazine, a member of the Automobile Journalists Association of Canada, and a judge for Canadian Truck King Challenge. He has over 13 years of editorial experience; over three years of maintenance, reliability, and operations experience; over 16 years of automobile industry experience, as well as small business industry experience.*

Can't find top talent? Take a look in the mirror

The hiring process nowadays is different than what it used to be years ago, but attracting and retaining employees comes down to using the same strategies used to sell to customers. **BY SHAWN CASEMORE**

Recalling being offered my first full-time job. It was working at Magna. I was so excited to receive the call to offer me the job, particularly after so many other people had applied.

The salary and benefits were all good, but I was just as excited for the opportunity to move into full-time employment after spending the majority of my life in school and working part-time jobs.

Fast-forward to today.

The job market is a much different place. Opportunities seem endless while talent seems scarce. Even McDonald's is struggling to compete, with a shift manager receiving somewhere in the neighbourhood of $17 per hour.

This isn't likely to change anytime soon.

Recent studies suggest that the Canadian economy is about 80 per cent of the way back to pre-pandemic levels from an economic standpoint. Moreover, the fact that the pandemic was essentially a forced recession means the rebound is going to be strong.

Herein lies the challenge.

If you are already struggling to find and retain talent, the market is only going to get tighter.

Unlike my first job so many years ago, today's employees are very sensitive to every aspect of a job offer, because there are so many to choose from, and the transparency in online information allows them to research and compare before they even get to the interview stage.

You might argue that wages are always a factor to consider, and that would be true. As are benefits, flexible time, vacation and the current leadership who set the goals, values and work environment.

However, what really attracts and retains an employee comes down to using the very same strategies you use to sell a customer.

Attraction: Why should the employee work for you?

Solution: What will you provide them if they do come to work for you?

Retention: How will you ensure you deliver on what you promised?

These aren't questions you can or should answer yourself. Instead, tap into your existing, past and potential employees to gain insights that will inform your actions.

If you're having trouble attracting new hires, then there is something wrong with how your company appears from afar.

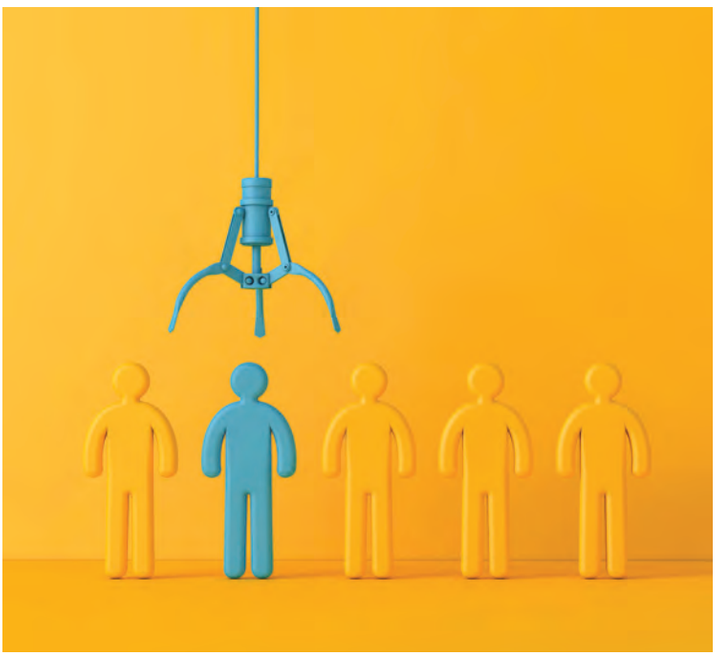
Ask potential employees the following questions:

- Does our website represent a company you'd want to work for?
- Are there comments you've found on sites like glassdoor.com that are concerning you?
- What have you heard from other's about working here?

If you can attract applicants, but they don't accept your job offer, then there's something wrong with the offer itself.

Ask potential employees who turned down your offer the following questions:

- Was there something that was said (or missed) in the interview?
- Did our offer meet with your expectations? If not, why?
- Have you had other more attractive offers? What made them more attractive?



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> ***Recent studies suggest that the Canadian economy is about 80 per cent of the way back to pre-pandemic levels from an economic standpoint. Moreover, the fact that the pandemic was essentially a forced recession means the rebound is going to be strong.***

If you don't have a hiring problem, but you can't seem to keep an employee, then there's something wrong with the employee's experience.

Ask existing employees or those who leave, the following questions:

- What was it that made you want to quit?
- How supportive was our leadership? Is there something you'd recommend we change or improve?
- Was your career path with us clear? What else is missing?

If this seems like it's too labour intensive, feel free to ignore.

However, as you read this, your employees are receiving inquiries on LinkedIn, by email and even by text for job opportunities.

Take a closer look at each of these three areas to identify where your most significant challenges lie. Then begin asking existing employees, past employees and new applicants what changes or improvements they'd like to see.

There's no shorter path to fixing your talent gap, then by making the changes your candidates and new employees want to see.

Shawn Casemore *helps companies accelerate their growth. To learn more, visit his web site at www.shawncasemore.com.*

How an industrial manufacturer wrote the next chapter of its 100-year plan

Two DuroVac presidents discuss the importance of financial stability and succession planning as an early necessity for every business.

With a lineup of industrial vacuum systems known for durability and reliability, DuroVac understands longevity better than anyone. Founder Kevin Weaver and President Anh-Tai Vuong are working to build a company that lasts 100 years or more. That's a lofty goal for a family-run business, but with a strategic approach, the duo ensures their shared vision for DuroVac has real staying power.

The vision is especially important as Weaver prepares for retirement, scaling back his role in the company he started over 18 years ago, while Vuong takes the reins as his successor. Their gradual leadership transition has been steered by purposeful planning and execution over several years.

They still have 80 years to reach their ultimate goal, but here's how they've successfully managed it so far:

Building from the ground up

Like many entrepreneurs, when he first started his company, Weaver did practically everything himself. He scrubbed floors, built walls, and installed cables at DuroVac's first office in Mississauga, Ont.

After working for DuroVac as an outside sales representative for two years, Vuong was the fourth employee to join the company full-time. As their reputation grew and Vuong settled into his role, he doubled the company's sales in his first year alone.

Even at that early stage, the notion of succession planning was on their minds. They both read Michael E. Gerber's bestselling book *The E-Myth Revisited: Why Most Small Businesses Don't Work and What to Do About It.* Guided by the book's principles, Weaver designed DuroVac as an integrated system that would one day be able to function without him.

"If you don't design your business properly, you'll have nothing left by the end," said Weaver. "You need to put systems in place so your business can run without you. Only then can you say this is a company and not a glorified job."

A key objective for Weaver was to gradually hire people who could take over all the tasks he was previously doing himself.

> ***"If you don't design your business properly, you'll have nothing left by the end," said Weaver. "You need to put systems in place so your business can run without you. Only then can you say this is a company and not a glorified job."***

"I've created systems and hired people in order to eventually work myself out of a job," said Weaver. "As long as I give them the autonomy to do their job — which is important — then I don't have to do it. I'm the opposite of a micromanager."

A sturdy financial foundation

A crucial aspect of futureproofing the business was to build a strong, fiscally conscious foundation. At the time, Weaver was partnered with his father-in-law, whose background in accounting helped to tightly manage finances in his capacity as Chief Financial Officer.

"There was no razzmatazz at first — no art deco office, no fancy cars, and flying coach was a must," said Vuong. "I tip my hat to Kevin and our CFO for crafting a very financially responsible company."

With the financial base they need to build a bright future, DuroVac can deliver on promises it makes to its customers, sustain a skilled and loyal team of people, and make time for a solid succession plan.

The promises

DuroVac's service revolves around a brand promise, which is all about rejecting planned obsolescence and making customers happy.

The brand essentially wants customers to be content with their purchase by saving them money, maintenance time and hassle. Sometimes that means troubleshooting issues post-purchase.

"Customer retention and loyalty comes from quickly finding the root cause of the issue and fixing it at no cost to the customer," said Vuong. "In order to do so, we need to be financially stable, because repairs can sometimes [be very costly]."

Financial stability helps the DuroVac team respond to problems and uphold their promises as a brand. It also helps them anticipate issues at the design phase and build stronger machines.

"Adapting our solutions to the market needs of our customers has helped define our identity over the years," said Vuong. "If someone sees an issue, it was always in our early DNA to react quickly to fix it for that customer and also down the line for future products."

The people

"If we were not financially sound, we would not have been able to hire the army of people who supported us throughout," said Vuong.

The right people in the right roles help DuroVac uphold its brand promises. To that end, employees are expected to uphold values of family, honour, respect, passion, discipline and decency in their work.

To inspire loyalty in the team, DuroVac works hard to maintain its culture. One of Weaver's career highlights is the fact that, in over 18 years of business, only one employee has ever resigned from their position — and that was because they were moving to another province.

"Our core values are founded around family, because we are a family-run and family-born business," said Vuong. "We're so proud of our core values. It gives people a broader purpose than just clocking in and clocking out."

They put just as much thought and care into the succession planning team, assembling a group of professionals such as lawyers, accountants and executive coaches familiar with the E-Myth approach.

"It's so necessary to equip yourself with a team. Legal and fiscal notions don't come naturally to all, and the coach helped us go

DuroVac staff together in one of their warehouses.

through the emotional side of the transition," said Vuong.

He adds that it was important for him and Weaver to put together a team of professionals from firms that were comparable in size to DuroVac, "We had a natural understanding of each other."

The plan

As Vuong prepared to take the reins from Weaver, the E-Myth approach was an invaluable roadmap to their transition.

"We both read the book at different stages of our career, but when it came time to transition, we converged towards its philosophies," said Vuong.

One of the core concepts of the E-Myth book is about the "primary aims" of the entrepreneur: what the person truly wants out of life and how that transcends the business. For Vuong, the primary aim was family.

"Once we established that our purposes in life go way beyond work and the business, we started to see the absolute need to work ourselves out of the business," he said.

After strengthening that understanding of their life's purposes, Weaver and Vuong used a time management module to schedule time away from their everyday duties and habits so that, with the help of their coaches, they could envision a viable future.

They had initially identified smaller, more manageable five-and-ten-year goals for their succession plan, but the executive coach prompted them to think bigger. This process helped them realize their ultimate vision: a company built to last 100 years.

"If IBM can do it, why can't we?" said Weaver. "Even if we're not around as individuals 100 years from now, the idea is to position our systems, equipment, brand, brains, people and management in such a way that DuroVac becomes a self-sustaining entity."

Looking forward to a bright future

Weaver admits that when he first started his business, succession wasn't on his mind.

"When you're first getting started, all you can think about is survival," he said.

But as the business grew, Weaver recognized the need to find and train his future replacement.

"I hired Anh-Tai as a fresh 25-year-old and molded him," said Weaver, who worked with Vuong for over 13 years and attended his wedding. "I recognized that Anh-Tai needed growth and I needed a method for succession. Now I've brought him on board, and it will be his path to find and mentor his replacement."

Weaver advises other business owners to start thinking about their succession as early as possible.

"You have to spend 10 years thinking about this," he said.

For Vuong, succession planning has always been a part of a bigger conversation about DuroVac's future.

"We didn't just start talking about succession," he said. "We started talking about how we're going to write the next chapter."

Article provided by DuroVac.

Photo: DuroVac

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Skill acquisition and definition – The Dreyfus Model

In 1980, a couple of brothers with the last name Dreyfus proposed a model of skill acquisition that has gone on to have a fair bit of influence on discussions about learning, process, and practice. Later, they would go on to publish a book based on this paper and, in that book, they would refine the model a bit to its current form. **BY RICHARD KUNST**

The model lists five phases of skill acquisition: novice, advanced beginner, competent, proficient and expert. There's obviously a lot to it, since it takes an entire book to describe it, but the gist of it is that skill acquirers move from "dogmatic following of rules and lack of big picture" to "intuitive transcending of rules and complete understanding of big picture."

When you consider the Dreyfus model, you'll notice that there is a trend over time from being heavily rules-oriented and having no understanding of the big picture to being extremely intuitive and fully grasping the big picture.

Michael Eraut summarized the five stages of increasing skill as follows:

1. Novice
- "rigid adherence to taught rules or plans"
- no exercise of "discretionary judgment"

2. Advanced beginner
- limited "situational perception"
- all aspects of work treated separately with equal importance.

3. Competent
- "coping with crowdedness" (multiple activities, accumulation of information)
- some perception of actions in relation to goal
- deliberate planning
- formulates routines

4. Proficient
- holistic view of situation
- prioritizes importance of aspects
- "perceives deviations from the normal pattern"
- employs maxims for guidance, with meanings that adapt to the situation at hand

5. Expert
- transcends reliance on rules, guidelines, and maxims
- "intuitive grasp of situations based on deep, tacit understanding"
- has "vision of what is possible"
- uses "analytical approaches" in new situations or in case of problems

Instead, the original Dreyfus model is based on four binary qualities:
- Recollection (non-situational or situational)
- Recognition (decomposed or holistic)
- Decision (analytical or intuitive)
- Awareness (monitoring or absorbed)

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All things being equal, one might assume that there is some sort of natural, linear advancement through these phases, like earning belts in karate or money in the corporate world. But in reality, it does not shake out that way, due to both perception and attitude.

At the moment, one starts acquiring a skill, one is completely incompetent, which triggers an initial period of frustration and being stymied while waiting for someone, like an instructor, to spoon-feed process steps to the acquirer (or else, as Dreyfus put it, they "like a baby, pick it up by imitation and floundering").

After a relatively short phase of being a complete initiate, however, one reaches a point where the skill acquisition becomes possible as a solo activity via practice, and the renewed and invigorated acquirer begins to improve quite rapidly as he or she picks "low hanging fruit." Once all that fruit is picked, however, the unsustainably rapid pace of improvement levels off somewhat, and further proficiency becomes relatively difficult from there forward.

This is actually the exact path that many teams and organizations follow on lean Initiatives, going from incompetence to some degree of competence. Many rapidly improve to the point of competence and then completely leveled off. In many cases, improvement hit a local maximum and then stopped altogether, as they become too busy to continue on the path as-is or to follow through with retooling. This is an example of what, for the purposes of this post, I will call "arrested development."

In the sense of skills acquisition, one generally realizes arrested development and remains at a static skill level due to one of two reasons: maxing out on aptitude, or some kind willingness to cease meaningful improvement.

Let's discard the first possibility (since most professional organizations or individuals wouldn't max out at or before bare minimum competence) and consider an interesting, specific instance of the second: voluntarily ceasing to improve "because of a belief that expert status has been reached and thus further improvement is not possible." This opting into indefinite mediocrity is the entry into an oblique phase in skills acquisition that I will call "expert beginner." When you consider the Dreyfus model, you'll notice that there is a trend over time from being heavily rules-oriented and having no understanding of the big picture to being extremely intuitive and fully grasping the big picture. The advanced beginner stage is the last one in which the skill acquirer has no understanding of the big picture. As such, it's the last phase in which the acquirer might confuse himself with an expert. A competent has too much of a handle on the big picture to confuse himself with an expert: he knows what he doesn't know.

This isn't true during the advanced beginner phase, since advanced beginners are on the "unskilled" end of the Dunning Kruger effect and tend to epitomize the notion that, "if I don't understand it, it must be easy." But what happens when the advanced beginner doesn't care enough to interact with the broader community and for whatever reason doesn't have much interaction with peers? The Daily WTH is filled with such examples. They fail even while convinced that the failure is everyone else's fault, and the nature of the game is such that blaming others is easy and handy to relieve any cognitive dissonance. They conclude that they've quickly reached expert status and there's nowhere left to go. They've officially become expert beginners, and they're ready to entrench themselves into some niche in an organization and collect a huge paycheck because no one around them, including them, realizes that they can do a lot better. When you understand the Dryfus model and see it in action, you can understand how organizations struggle and stall in their lean journeys because they feel they have become experts and have nothing left to learn. When in reality they are just expert beginners and just starting. It is all about culture speed of methodology absorption.

Richard Kunst *is an author, speaker and seasoned lean practitioner based in Toronto, who leads a holistic practice to coach, mentor and provide management solutions to help companies implement or accelerate their excellence journeys. You can reach him at www.kunstsolutions.com.*

Don't let safety measures slip: How to prevent slips, trips, and falls at work

With over 55,000 workers in Canada injured annually because of fall incidents, workers and managers on the plant floor need to be aware of the risks that come with the job and know how to stay safe.

In addition to the thousands of fall-related injuries that make up the 20 per cent of time-loss injuries accepted by workers' compensation boards or commissions across the country, statistics also show that the majority of falls (67 per cent) happen on the same level resulting from slips and trips. The remaining 30 per cent are falls from heights, like ladders or roofs.

Falls on the same level, like slips and trips, happen when there is some unexpected change in the contact between the feet and the ground or floor. Spills, a leaking machine, or a change in temperature causing a liquid to freeze are just a few examples of such unexpected changes. To prevent these changes and the injuries that can happen from them, there are four factors that should be addressed in preventing fall incidents: good housekeeping; quality of walking surfaces; proper footwear; and pace of walking.

Good housekeeping is good practice for fall prevention

Good housekeeping is the first and one of the most important factors in preventing falls due to slips and trips. It involves cleaning all spills immediately and marking spills and wet areas, mopping or sweeping debris from floors, storing equipment properly, and removing obstacles from walkways and always keeping them free of clutter, like everyday items such as boots or shoes and equipment.

Always secure mats, rugs and carpets with tape, tacks, so they're flat, and cover cables that cross walkways to prevent trips. Brightly coloured tape may be helpful to draw attention to the potential hazard. You should always make sure that items below eyesight, like file cabinets or storage drawers, are also closed, and keep working areas and walkways well lit, making sure that light bulbs and faulty switches are replaced when necessary.

Provide sure footing with safe flooring

Changing or modifying walking surfaces to provide "sure footing" is an important step in preventing slips and trips. Recoating or replacing floors, or installing mats, pressure-sensitive abrasive strips or abrasive-filled paint-on coating and metal or synthetic decking can further improve safety and reduce the risk of falling. Also, resilient, non-slippery flooring prevents or reduces foot fatigue and can help prevent slips.

Take the right steps with proper footwear

Although it's the worker who will wear the footwear, employers are responsible for making sure that personal protective equipment (PPE) requirements are being followed in the workplace. When it comes to slips, trips and falls, assess your environment and the type of work to understand if footwear contributes to the risks.

In workplaces where floors may be oily or wet or where workers spend a lot of time outdoors, selecting proper footwear is essential to preventing falls. Since there is no anti-slip footwear ideal for every condition, it is recommended to consult with manufacturers for the available options best suited to the workers' needs.

Keep up the fall prevention

Workplaces can support a safe environment by identifying and addressing potential risks through regular workplace inspections. For example, this could include inspecting the parking lot, walkways, and other surfaces, and correcting any hazards such as potholes and slippery or uneven surfaces. It is also important to train employees on the steps they can take to avoid falling at work and making sure that they are able to take their time and pay attention to where they are going. Workers should walk at a pace that is suitable for the surface and the tasks they are doing, with their feet pointed slightly outward and make wide turns at corners.

Employers can also reduce risks by installing light sources that provide sufficient light for tasks; providing flashlights for workers to use if they are entering a room with little to no light; and ensuring that the objects workers are carrying or pushing do not prevent them from seeing any obstructions, spills, or other potential hazards.

Because workplace safety is a shared responsibility, employers and employees need to work together to reduce hazards related to slips, trips, and falls. By implementing these tips and measures, falls on the same level can become top of mind, and workers can continue to do their jobs safely.

Prevent-the-Trip Tip

When assessing PPE like footwear for your workers, be sure to consider the following:

- Is the sole made of appropriate anti-slip material for the flooring or walking conditions?
- Is there a risk of the soles quickly becoming dirty or worn out which reduces the slip-resistant qualities?
- Is the shoe secure on the foot (e.g., are laces or a closed back required)?
- Is there a need to provide support to heels and ankles to help reduce twists and sprains?

The Canadian Centre for Occupational Health and Safety (CCOHS) *in Hamilton contributed this article. CCOHS provides information, training, education, management systems and solutions that support health and safety programs and the prevention of injury and illness in the workplace. Visit www.ccohs.ca.*

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NewTek Sensor Solutions series of Difference/Sum LVDT signal conditioners that improve a sensor's performance during large temperature variation.

By measuring the difference of the output over the sum (S1-S2)/(S1+S2), the NTC-6000-DS Quick-Cal LVDT signal conditioner compensates for changes in resistance in copper windings due to temperature fluctuations. The ratio metric signal conditioner is for use with AC- LVDTs in harsh environments with extreme temperature swings such as aerospace test stands, packaging equipment, factory automation, turbine control systems and steam valve positioning.

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Binder USA's 712 and 702 series M9 circular connectors will be manufactured using a zinc die casting process.

The previous process consisted of a drawn tube pressed into shape. The new method enhances safety and quality features without impacting the way customers use the connectors.

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Binder's M9 subminiature circular connectors are used in applications including: camera systems, sensors, and pneumatic control systems.

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EASYSWITCH HEPA WET-DRY VAC

Exair's EasySwitch HEPA Wet-Dry Vac simplifies the filter change process when switching from vacuuming a dry material to a liquid or vice versa.

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The EasySwitch vacuum creates does not need electricity (79 decibels). Because the vacuum generator has no moving parts and uses no electricity, there is little concern for failed parts, motor failure or working with liquids associated with electric industrial vacuums.

www.exair.com

SINUMERIK ONE DYNAMICS

Siemens launched three technology packages for its Sinumerik One control system.

The Sinumerik One Dynamics packages are available in three different variants: One Dynamics Operate, One Dynamics 3-axis milling and One Dynamics 5-axis milling.

The software functions contained in each technology package support users from machine-oriented programming in the job shop to machining of CAD-CAM-programmed workpieces.

The ONE Dynamics Operate package supports the machine tool user in programming in the machine shop with the proven Sinumerik machining cycles and CNC simulation for milling and turning applications.

Users have the option of paperless manufacturing and can visualize 3D CAD data on the shop floor. For the execution of CAM-generated CNC programs for free-form surface machining, One Dynamics three-and-five-axis milling packages offer the Top Surface and Top Speed Plus CNC functions for motion control and workpiece surfaces.

new.siemens.com

For more new products, visit: ***www.plant.ca/technology-centre/***

POSTSCRIPT
BY JAYSON MYERS

Help build manufacturing skills and entrepreneurship through indigenous education

When Paul Martin quit national politics he didn't step away from the national policy scene or his interest in Indigenous education. The former prime minister founded the Martin Family Initiative (MFI); a charity that works with First Nations, Inuit, and Métis Nation Peoples to improve education, health, and well-being outcomes for Indigenous children, youth, and adults.

MFI aims to support Indigenous students as they learn how to create successful careers. Its Aboriginal Youth Entrepreneurship Program introduces Indigenous high school students to business opportunities in the Canadian economy. It teaches students how to nurture their entrepreneurial spirit, improve their financial literacy and communication skills, and gives them an opportunity to explore a variety of post-secondary options.

Over 5,000 students have completed the program since its inception 11 years ago. Today, the course is being taught at 50 high schools on and off reserve. It is in such high demand that in 2019, MFI, acting on a request from the Assembly of First Nations Chiefs, launched an Indigenous Entrepreneur Course for adults, based on its high school program.

Indigenous education programs like these will shape the future for a large number of young people across Canada. While Indigenous peoples account for about five per cent of our national population, Indigenous children under the age of 14 represent seven per cent of all children in the country. Youth represent nearly half of Canada's Indigenous population. They are the youngest and fastest growing segment of Canada's population. In Mr. Martin's view, "If we want Canada to succeed, Indigenous children and youth must succeed…. Their potential is our future."

Real labour shortages exist everywhere across Canada's manufacturing sector. That's nothing new, but the results of every industry survey indicate that the situation is getting worse. Skills shortages are aggravated by the deployment of advanced technologies as manufacturers are turning to automation to compensate for labour shortages. Competition is tough today for any company looking to attract employees with the right combination of digital skills, practical industry experience, and essential workplace skills that it takes to operate a modern manufacturing business.

While Indigenous peoples account for about five per cent of our national population, Indigenous children under the age of 14 represent seven per cent of all children in the country. Youth represent nearly half of Canada's Indigenous population.

That's why Next Generation Manufacturing Canada is partnering with MFI to develop a manufacturing component in its high school and adult Indigenous education programs. NGen support will also allow MFI to expand its entrepreneurship and financial literacy courses into primary schools and set up a summer employment program for Indigenous youth. Our aim is to raise awareness among Indigenous students about modern manufacturing in Canada and the type of jobs that exist in the sector, and prepare them with many of the skills and some of the practical experience required to take advantage of future post-secondary and career opportunities.

Now, it's difficult to predict the exact types of skills that will be in demand in five years' time. Manufacturers always struggle when asked that on surveys. However, we do know many of the basic competencies that future manufacturing workers will be expected to have. They are the very skills that MFI aims to help Indigenous students develop in its programs.

Let's start with the basics. Building self-confidence is key, particularly among Indigenous students. Other personal attributes are also important. Companies will expect employees to be responsible, dependable, and reliable. They will be looking for individuals with a high degree of integrity who want to contribute to the future. Future employees will need to work well with other people and value diversity and inclusion among their colleagues. Initiative will be highly valued. They should be curious and like to learn new things.

Academic skills – reading, writing, financial literacy, communication skills, critical thinking, research and data analysis capabilities, basic computer skills, as well as knowledge of math and science – are important as well, particularly for employees working with advanced technologies. They are skills that can be applied directly in manufacturing.

Problem solving – that's where innovation and entrepreneurship come in. Students who can find innovative, more efficient, and more effective ways of doing things will be highly valued whatever their job is. Practical experience and demonstrated ability to work in teams are also gateways to good jobs and valuable learning experience. They help to ground knowledge through experience with real problems.

Indigenous students also need support in developing their digital skills and improving their comfort level working with data and data-based technologies. Through another of its initiatives, NGen is aiming to provide easy low-cost access to cloud-based online coding courses as well as to robotics and IT network simulations for students across Canada. It's a good example of how technology can enable learning and not just be the object of education. For the first time, Indigenous students in remote locations will be able to develop digital skills and participate in robotics competitions on their own personal devices, wherever they are, without downloads that eat up scarce bandwidth.

However, let's face it. It's not just about students and educators. Manufacturers themselves need to be involved. Teachers are crying out for speakers, mentors, opportunities to visit manufacturing facilities, tools, and information that can make their jobs easier. Also, students are looking for role models and opportunities that will provide them practical work opportunities.

NGen will be looking for manufacturers who are willing to volunteer as speakers, mentors, and part-time employers. We hope you'll offer your support.

Check out what MFI is doing at ***www.themfi.ca.*** *And, for more information about how to get involved, contact* ***info@ngen.ca.***

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