

PUSHING AHEAD

**New WA480-8 yard
loader arrangement**

**Loads highway
trucks quickly**



A Message from the President



Ronald Zagami

**2022 looks
bright for
construction**



Dear Valued Customer:

We hope your 2022 is off to a wonderful start!

This year looks like another good one for construction. Industry economists and experts seem to agree that there will be growth overall, and the supply chain issues plaguing material acquisitions and driving up costs will ease in the latter half of 2022. They also believe that's when the impacts of the new infrastructure bill, which Congress passed in late 2021, will begin to take effect. We've highlighted some of the benefits of the bill, aka the Infrastructure Investment and Jobs Act, inside.

However, forecasters continue to see a shortage of workers, so recruiting new personnel from Generation Z could be a good way to grow your staff. There is an article inside on what you can do to reach this critical audience and attract members of the iGeneration to your company.

We also highlight some new products, including the Komatsu WA480-8 yard loader arrangement that is designed to be a three-pass match for loading aggregate and other materials into on-highway trucks. It is great for infrastructure, forestry and non-residential applications, too.

Because it is essential to assess each of your projects in-depth, we offer several questions about practices, processes and operations that you may want to ask before, during and after a project.

There are several other interesting and informative articles to help your business, including tips on preparing your staff and equipment for the upcoming busy season.

As always, if there is anything we can do for you, please call one of our branch locations.

Sincerely,
Clairemont Equipment Company



Ronald Zagami,
President



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Capital infrastructure program management and delivery require a roadmap to digitalization



Balaji Sreenivasan,
founder and chief
executive officer,
Aurigo Software
Technologies

About the author: Balaji Sreenivasan has played a critical role in shaping Aurigo to be a modern enterprise cloud software business that is helping infrastructure owners plan and build over \$300 billion of capital projects more efficiently. Balaji spends his time on product strategy, customer delight, and enabling the amazing set of people at Aurigo to be their best.

American infrastructure has needed our attention for decades. We're reaping the consequences of years of neglect, and the roads, bridges, utilities and government buildings in our country are failing. In 2007, a Minnesota bridge collapsed during rush hour. Thirteen people were killed, and 145 were injured. Last year, in 2021, a winter storm led to power outages across Texas leaving people stranded and freezing — and more than 200 dead.

Thankfully, Congress passed a \$1.2 trillion infrastructure bill that will help us rebuild the failing parts of our infrastructure. However, with an exceptional amount of taxpayer funds designated for these projects, they must move according to schedule and stay on budget. Most capital construction projects are 20 months behind schedule and 80% over budget. This problem exists because current infrastructure departments and processes are obsolete and far behind in digitalization advancements.

To solve these critical issues, a digital transformation is needed. Most capital projects have been managed using paper documentation or out-of-date technology, but these methods cause essential information to be siloed across collaborating departments. Cloud-based, enterprise-level digital tools are

available for the management and delivery of capital programs across the planning, building and operating life cycle. These novel solutions make it possible for every project stakeholder to collaborate in one system, providing a single source of truth for the years-long, billion-dollar projects that exist in the infrastructure market.

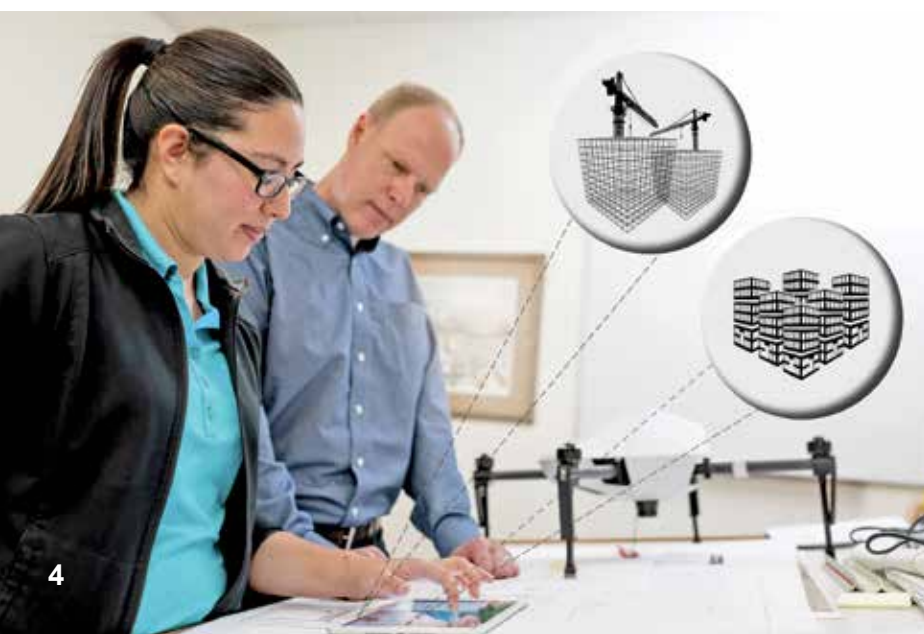
Digitalization will increase transparency and ensure that government entities direct the correct amount of funding to the most important projects. With an enterprise-level, cloud-based platform, every step of the project is simplified and streamlined. Manual spreadsheets and paper documents cannot support the complex projects that will come as part of this new infrastructure initiative. In-house project management software is too time-consuming to develop and will likely become less functional, or even obsolete, by the time a project nears completion. The shift to digitalization will allow capital project owners to easily identify critical problems or delays along the capital program life cycle. This will reduce time wasted on reworking and maximize the project's overall efficiency and performance.

The entire project process will be expedited when digital tools are in use. Electronic approvals enable greater safety, security and adherence to industry standards. Managers can ensure that each element of the project goes according to plan, and each stage can be approved in a timely manner to keep projects moving forward.

Digital-first solutions are highly configurable, which allows administrators control to customize applications to each project's unique specifications. They can also keep projects on track, reduce time for approvals, and are easier to audit when the project is completed. Mobile-optimized capabilities are additionally an essential advantage for stakeholders who spend the majority of their work hours on-site and out of the office, so decisions and approvals can take place out in the field in real time.

With digital tools at the ready, and efficient processes in place, capital project owners and managers can build a better future to support the American dream for generations to come. ■

With an enterprise-level, cloud-based platform, every step of the project is simplified and streamlined.





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New iMC 2.0 D71i-24 dozer allows earthmoving contractor to 'move a lot of dirt and maintain accuracy' in higher gears

In the early 1980s, Steve Brown founded Linco Construction Co. Inc. — named after his father, Lindbergh, and his daughter, Lindy. The company began as a concrete contractor, but Brown quickly realized he needed to expand the firm to better control scheduling and the quality of the prep work before pours could be done.

"We would get ready to set forms and realize the grade of the dirt work was way off, so we got into earthwork to alleviate that problem," recalled Brown.

He has always believed that having the right tools to move dirt is essential. In 2000, Brown made a notable change to his earthmoving equipment fleet by adding GPS grade control to his dozers. Productivity and efficiency increased significantly, and operators were able to move dirt faster and more accurately with less staking and surveying costs.

One machine doing the work of two

Brown said costs were further reduced when Linco Construction started using Komatsu intelligent Machine Control (iMC) dozers with factory-integrated GPS grade control. The dozers require no masts or cables that could potentially be damaged. Linco Construction has run D51i and D61i dozers for several years. Its latest addition is a 51,000-pound-plus D71PXi-24 — Komatsu's largest hydrostatic transmission dozer with iMC 2.0.

"We do a lot of jobs that involve importing dirt; sometimes we're putting down 300 to 400 truck loads a day," Brown explained. "Typically, we would use two smaller dozers, but the D71i allows us to do the work with one. It will get ahold of a 22-yard trailer load and push it with no problem at all. With its wider and taller blade, you can move a lot of dirt and maintain accuracy even in second and third gear. That allows us to put the D51s and D61s on other tasks." ■



Steve Brown,
CEO/president



Discover more



Operator Alejandro Acuña moves a load of dirt with a Komatsu intelligent Machine Control 2.0 D71PXi-24 dozer. "It's perfect for pushing large amounts of dirt, especially on big excavation jobs," said Acuña.

▶ VIDEO



Infrastructure Investment and Jobs Act brings historic investments

The recently passed \$1.2 trillion Infrastructure Investment and Jobs Act (IIJA), aka the Bipartisan Infrastructure Deal, will reauthorize surface transportation programs for five years and invest \$110 billion in additional funding to repair America's aging roads and bridges. With nearly \$40 billion dedicated to the latter, that is the single, biggest investment in bridges since the construction of the interstate highway system in the 1950s, according to the Biden administration.

Transportation safety programs will see \$11 billion in funding, including \$5 billion for the new Safe Streets and Roads for All program, established to help states and localities reduce crashes and fatalities in their communities. Another new program provides grants to community-owned utilities to replace leaky and obsolete cast iron and bare steel natural gas pipelines. In total, the infrastructure bill is projected to more than double funding directed to programs that improve the safety of people and vehicles.

Largest outlay for water systems

The spending package also includes the largest investments in other infrastructure

systems. To expand access to clean drinking water for households, businesses, schools and child care centers all across the country, \$55 billion will be dedicated to address water contamination and the replacement of lead pipes.

IIJA sets aside \$50 billion to protect against droughts, floods and wildfires, as well as weatherization, in an effort to increase the resilience of physical and natural systems from extreme weather events.

Modernizing for the 21st century

With major investments to connect rural areas, low-income families and tribal areas, \$65 billion will be dedicated to expanding broadband internet access. The bill includes provisions to make internet service more affordable and easier to compare prices.

An additional \$65 billion will modernize the nation's power grid and build thousands of miles of new, resilient transmission lines to facilitate the expansion of renewable energy.

Updates to the nation's power grid should allow more electric vehicles to be charged, and IIJA provides \$7.5 billion to build the

Airports are to receive \$25 billion to address repairs and maintenance backlogs, reduce congestion, and drive electrification and other low-carbon technologies. Ports, rail and buses are among the other public transportation sectors seeing significant funding for modernization.





Roads and bridges receive the largest amount of funding in the Infrastructure Investment and Jobs Act at \$110 billion; nearly \$40 billion of which is dedicated to bridges. Transportation safety is to receive \$11 billion.

first-ever national network of electric vehicle (EV) chargers in the United States. This funding includes the deployment of EV chargers along highway corridors to facilitate long-distance travel, and within communities to provide convenient charging where people live, work and shop.

Updating public transit

In total, the new investments and reauthorization in IIJA guarantee \$89.9 billion in funding for public transit over the next five years — the largest Federal investment in public transit in history. The legislation will improve accessibility to all users, bring transit services to new communities, and replace thousands of deficient transit vehicles with clean, zero-emission vehicles.

The legislation also invests \$66 billion in rail funding to eliminate the Amtrak

maintenance backlog, modernize the Northeast Corridor, and bring service to areas outside of the northeast and mid-Atlantic. Airports will get \$25 billion to address repairs, reduce congestion, and drive electrification and other low-carbon technologies.

Job openings

Additionally, the infrastructure bill will drive the creation of good-paying union jobs and grow the economy sustainably and equitably. Combined with the President's Build Back Framework, it is estimated that on average, 1.5 million jobs per year will be added for the next 10 years.

Opportunities for construction workers, truck drivers, architects, mechanical engineers and cybersecurity analysts, among others, are likely to increase. ■

Your busiest time of the year is near. Make sure equipment and personnel are ready for maximum production

During the winter months, your machinery may have sat for a long period of time, or you may have kept working and just had routine services done during that time. Either way, it is vital to take steps to ensure your equipment is ready for the busy summer days that lie ahead.

Don't wait

If you have any outstanding work orders or operator repair tickets, finish them as soon as possible. Thoroughly inspect machines a few weeks before the schedule really heats up, and if you find any issues, address them right away. Remember, larger items such as undercarriages take more time to repair, so inspecting them well ahead of time is vital.

Buckets, blades, cutting edges and ground engaging tools such as teeth require attention, too. Make sure there are no cracks, chips or excessive wear that could affect safety and performance; replace if needed. Check that your attachment hoses and connectors are in good working order and ready for hydraulic fluids. Hook them up briefly, and run them to see if they are working properly.

Prepare staff members

Make sure employees are aware of schedules, procedures, emergency protocols, and

the dangers and signs of heat-related illnesses. Employees should also know how to report maintenance items, the functions of new machines, and how to use them to maximize production and efficiency. Plus, make sure they have all the necessary personal protective equipment and that it is in good condition.

Stock up on parts

You should have an easily accessible store of basic maintenance items on hand such as grease, fluids, filters and belts. Having these on hand will save you from making frequent trips to the store, and decrease your overall downtime.

Clean the machine

Have you heard the adage that a clean machine runs better? True or not, you should wash your equipment to remove any dust and/or dirt buildup from storage or from use during the winter months. Cleaning can help you spot potential issues. Remove any debris, including from the engine compartment. Look out for rodent and/or bird nests.

Don't overlook the inside of the cabs — clean the glass, and dust the consoles and dashes. Replace missing or damaged safety decals.

Charge batteries

If you stored batteries, be sure to check them. Before using them, ensure proper water acid levels and fill, if necessary. Batteries that were not charged during storage should be. Coating battery connections with an anti-corrosion spray can prolong system life. Replace batteries if you believe there is any doubt about their safety or reliability.

Check fluid levels

It is essential to keep fluids at proper levels. Make sure there is an operating and maintenance manual available in your machine year-round, and refer to it for guidance. Be sure to grease any points that require it.

As temperatures rise, you should switch to fluids that properly match the ambient temperatures. If the machine requires diesel exhaust fluid, draining it and refilling it with new fluids to maintain purity and concentration is highly recommended, regardless of if you used the machine during

Thoroughly inspect your machinery before the busy construction season starts to ensure it is ready for maximum performance. Make sure everything is in working order and fluids are at their proper levels. Don't forget to check technology.





During the busy season, your machinery and personnel work hard, so make sure both are ready ahead of time. Check your equipment's undercarriage, ground engaging tools, fluids, components and other critical items. Make sure staff members have all necessary personal protective equipment and that it is in good condition.

the cold winter months or not. Switch fuel to a summer blend such as No. 2 diesel, and drain the lines of any condensation.

Pay attention to hoses and filters

If fluids are the lifeblood, hoses are the arteries that carry it. Check them for abrasions and leaks; replace immediately if any are found.

Cold can affect filters, so consider replacing them with new ones, including air filtration and air conditioner filters, so operators have a cleaner, more comfortable environment. Dust and contaminants affect filter performance, so keep a close eye on them, and change them as often as necessary.



Don't overlook technology

Check the connections on your aftermarket GPS systems, as well as those that go with removable monitors. Turn the machine on, and test telematics systems to make sure you can monitor machines through your computer or smart devices. ■

Starting a new project? Ask these questions first

All construction projects have unique considerations, but there are several common questions you can ask yourself that will help you plan, execute and learn with each one. Here are five important questions to think about when working on a new project.

Do I have all the data I need to put together an estimate and bid the job?

Having a set of plans doesn't always tell the whole story. To set yourself up for success, it's critical to have a thorough understanding of what the job site looks like before you ever think about submitting a final bid. Site owners, developers and general contractors will often have a walk-through prior to the bid date. Attend the walk-through meeting so you can see the actual conditions and elevations and determine if there are items on-site that are not on the blueprints or documents. Those will need to be addressed and considered as part of your bid.

A site visit gives you a chance to ask questions as well. If there is something at the site that is not listed on the plans — such as a small pile of concrete — you can determine who is responsible for its removal or if it should somehow be incorporated into the sitework. There will be a cost, whether you are hauling it off-site or repurposing it, but the difference in your final estimate could be significant.

Asking questions to ensure you have enough information to estimate and bid a project is critical, and so is learning from your practices and people.



Are the machines I have really the best ones for this job?

Think about this question before you put the blade or bucket into the ground. Using the proper machinery for a job is important. It doesn't make sense to bring a tight tail swing excavator to a wide-open job site where mass amounts of material need to be moved quickly. Conversely, a standard excavator is not practical for confined spaces, such as digging against a building or in a lane of traffic.

Improperly equipping the project leads to frustration, lack of productivity and probably decreased profits. If you don't have what's needed for a particular aspect, consider renting. This allows you to get the job done without a long-term commitment to machinery you only need for a short amount of time.

Am I leveraging and maximizing technology?

From initial GPS grading systems to software that replaces traditional pen-and-paper estimating, construction technology has grown considerably. That technology is allowing companies to track every phase of a project digitally and share that information with all relevant parties — owners, contractors, etc. Job site management software and apps are abundant and save time and paper costs.

In addition to using the information to adjust practices on current jobs, it can be used for more competitive and accurate bidding and project management on future projects. You can also use data from the machines themselves. Nearly all new Komatsu machines have telematics that deliver production-related information, such as hours moving earth versus idle time, modes used and more. This data can be used to track job site practices and ensure operators are using the machines and matching them to the materials and applications necessary to help maximize efficiency and productivity.

Telematics let project and fleet managers see the information remotely in near real time, so they can make faster decisions if changes are needed. There are also applications available through desktop and laptop computers, as well as by smartphones and tablets, that let you make plan changes and see what operators see remotely, saving you time and the expense of driving to the job site.



There are various ways to determine if you are on schedule and profitable. In addition to traditional site visits, you can use technology from telematics and remote applications to track progress in near real time from almost anywhere.

Today's machines are more technologically advanced, too. Remember those early days of GPS grading when you needed bolt-on components that got damaged and had to be taken down and put up every day? They are still around, but might not be for long. New equipment now has that technology built in.

What am I learning from the project?

There is an adage, "If you are not growing, you're dying." In business, that does not have to mean adding employees or equipment, or taking on larger jobs. Growth can come from learning more productive and efficient ways to complete jobs.

With technology, you don't have to physically be on the job site to track production or rely on timecards and anecdotal information to see if your schedule and budget line up. Learning to use technology and apply data to job site practices more quickly is a great way to "grow."

What do I do with my profits?

There are many ways to use the money you make from projects. Some suggestions include using the profits to grow your business, paying down or refinancing debt, investing in your staff, or saving for a rainy day. It's always a great idea to talk to your financial adviser to determine what's best for you and your business.

"... You don't have to make all-or-nothing decisions about what to do with your cash once your company reaches the black," according to the article "5 Things to Do With Your Small Business Profits." "You may choose to leave some cash in the company to increase its value, pay a dividend or give your employees raises. You could buy a new piece of equipment and increase your own salary. It's up to you and your goals for running your business. Being in the black just means you have a lot more choices and opportunities." ■

Editor's Note: This information is excerpted from a longer article. To see it in full, scan the QR code or visit <https://www.komatsu.com/en/blog/2021/starting-a-new-project-ask-these-questions-first/>





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Want a versatile loader with the capacity to load highway trucks quickly?

Loading and moving materials in as few passes and cycles as possible not only helps increase productivity, but it also reduces costly wear and tear on machines. One versatile machine that offers that across multiple applications provides a distinct advantage.

"The WA480-8 yard loader arrangement is designed to be a 3-pass match for loading aggregate and other processed materials into highway trucks," said Adam Braun, Komatsu product marketing manager. "It is also adaptable for use in infrastructure, forestry and non-residential construction applications."

A host of new features contribute to its high production in truck loading, carrying, stockpiling and hopper charging applications. Among them is a Komatsu designed, 7.2-cubic-yard bucket with curved side edges built to minimize spillage. Its internal space and shape provide smooth material flow, and the long bucket jaw and decreased strike plane angle results in easy fill and low resistance during pile penetration. Operators can easily see how much material is in the bucket with the integrated load meter system in the cab.

More than 1,400 pounds of added counterweight compared to a standard WA480-8 gives the yard loader arrangement the ability to handle increased bucket capacity and improves stability. Low-profile tires with increased ground contact and new heavy-duty front and rear axles provide additional stability. The front and rear frame have been redesigned on the yard loader arrangement with an increased diameter for a larger center hinge pin that connects the two.

Added productivity features include excellent visibility to the pile and surroundings, an easy-to-operate Advanced Joystick Steering System (AJSS), and a comfortable air-suspension seat. Outside the cab, there are front frame steps, a folding left-hand mirror, tie off points and a front cab grab rail.

Maximized brake life

Another highlight of the WA480-8 yard loader arrangement is the new highly efficient air-cooled braking system designed to

maximize brake life in extended load-and-carry or high-speed applications. The dedicated system enhances higher cooling efficiency even in tough environments. In severe test conditions, the cooling system demonstrated a 56 to 58 degree Fahrenheit better cooling effect.

"Stable cooling performance under high duty cycle operation reduces the risk of hydraulic oil overheating," said Braun. "The electric drive pump has a sensor that senses the axle temperature and activates only when needed." ■



Adam Braun,
product marketing
manager, Komatsu



To learn more about the new WA480-8 yard loader arrangement, visit <https://www.komatsu.com/en/products/wheel-loaders/>



Komatsu's new WA480-8 yard loader arrangement is designed to be a 3-pass match for loading aggregate and other processed materials into highway trucks. It features a 7.2-cubic-yard bucket with curved side edges built to minimize spillage. A highly efficient air-cooled braking system helps maximize brake life in extended load-and-carry or high-speed applications.

Quick surface creation lets you perform simple operations with your iMC 2.0 dozer without digital plans



Ron Schwieters,
senior product
manager, iMC and
hardware, Komatsu

Moving dirt with little or no staking and surveying has become much easier with integrated GPS grade control. Simply upload 3D data, perform a short calibration, and you're ready to strip, push, place and grade materials.

However, what if you have a task that's not in the plans? Perhaps you want to create a level surface for a job site trailer, or it's about to rain and you want to make sure water drains to a certain area.

"Even without plans, you can easily get simple jobs done in short order with the quick surface creation feature on new iMC (intelligent Machine Control) 2.0 dozers," said Ron Schwieters, Komatsu senior product manager, iMC & hardware. "It lets operators easily create a temporary design surface."

Quick surface creation on Komatsu intelligent Machine Control (iMC) 2.0 dozers lets you create a surface in a few easy steps without plans. "This is a great tool for times when there is no 3D data available," said Ron Schwieters, senior product manager, iMC & hardware for Komatsu. "You can use it for a wide variety of tasks, including stripping topsoil and haul road cleanup. It's another way to utilize and maximize your investment to the fullest."

To use quick surface creation:

- Lower the blade to the ground or target elevation.
- Press the "quick surface creation" button on the monitor. Values are entered automatically based on your current blade position.
- Adjust values, if desired. When you are ready, press "OK" to set the temporary design surface. The "quick surface adjustment" button will display.
- Move material.

Easy adjustments

You can adjust the temporary design surface parameters by pressing the "quick surface adjustment" button. Touch the desired parameters to be modified and adjust accordingly.

"This is a great tool for times when there is no 3D data available," said Schwieters. "You can use it for a wide variety of tasks, including stripping topsoil and haul road cleanup. It's another way to utilize and maximize your iMC investment to the fullest." ■



Contractor reaches target elevation faster with new auto tilt bucket control that can follow unique design surfaces

Bobby and Allen Tripp spent countless hours running drag lines and operating dozers for their uncle while growing up on their family's farm. In 1997, the brothers transitioned from farm work when they established their own company, Tripp Bros Inc., which has steadily grown into a turnkey site development operation.

The firm's projects range from installing new construction infrastructure to resurfacing city and town streets. For maximum efficiency, the firm completes all aspects of a project in-house. To meet tightened grade tolerances and compensate for the declining number of experienced operators, the company has turned to GPS-equipped machines.

"The knowledge and skill lost from older operators leaving the industry — and with younger operators replacing them — GPS technology has become essential to our business," stated Bobby. "We rely on the technology to help our operators reach grade. Without our GPS-equipped machines, it would take us three times as long to complete the work."

At its residential jobs, which comprise 75% of the firm's current workload, creating as-built storm retention ponds is a challenge.

"The ponds are an environmentally conscious way to treat water before it's released from the site," noted Bobby. "Because each pond is unique, you can hardly dig them without diverting extra labor and equipment to keep it within tolerances."

Bobby continued, "We've found that with our Komatsu PC210LCi excavator with the new auto tilt bucket control, our operators can build the pond to grade more accurately than they could with a person shooting grade or checking them with a rover."

Maximum efficiency with iMC 2.0 with auto tilt bucket control

Bobby said that the new intelligent Machine Control (iMC) 2.0 technology on the PC210LCi-11, with the optional auto tilt IMU sensor, makes grading the ponds more efficient. By using Komatsu intelligent excavator auxiliary hydraulics, the auto tilt IMU sensor enables automatic control of the bucket/attachment angle to match the cutting edge of the surface.

Like all iMC excavators, the full bucket profile protects against over-excavation — even when the machine is not facing directly toward the target surface. With iMC 2.0 and the IMU sensor, the full bucket edge stays on the surface and automatically returns the bucket to a horizontal position for unloading.

"The machine is set up to tilt the bucket on its own and match a swale based on the design," explained Bobby. "We call it a 'one and done motion' because you don't have to go back and regrade the surface. The tilt bucket slopes, shapes and takes the pond to grade as you go."

"The auto tilt bucket control increases the machine's versatility and removes the need for an iMC dozer to check grade," added Alan Yoder, superintendent. "You're able to tilt the bucket instead of moving the machine to get the correct angle. Even our inexperienced operators find it easier to understand and control."

Bobby notes that the iMC 2.0 PC210LCi excavator improves Tripp Bros' efficiency contouring and crowning roads as well. "When we're undercutting a section of road, we can undercut the surface at a 2% fall and shape a crown in the road. The precision means we don't have to touch material twice. I haven't seen anything on another machine that compares to what this excavator can do." ■



Bobby Tripp,
president



Alan Yoder,
superintendent



Watch the video

Superintendent Alan Yoder excavates a storm retention pond using a Komatsu intelligent Machine Control (iMC) 2.0 PC210LCi-11 excavator with auto tilt bucket control.

"The auto tilt bucket control increases the machine's versatility and removes the need for an iMC dozer to check grade," said Yoder. "You're able to tilt the bucket instead of moving the machine to get the correct angle."

▶ VIDEO



The top reasons robots are suited for construction work, and what's holding them back

Could robots, smart systems and automated processes someday soon control the full operation of a construction site? Would it make the job of a project manager easier or harder in the short term? Long term?

Numerically, there are some clear wins for productivity when you leverage the repeatability of a robotic element to get work done, versus the variability of human work. For example, using a conveyor belt, robotic arm and concrete pump, Construction Robotics' SAM100 (Semi-Automated Mason) can lay 3,000 bricks per day as it works alongside a mason. A human bricklayer typically averages around 500. So, does that mean a crew of SAMs can or even should replace a human crew? Not any time soon, according to one expert.

"We don't see construction sites being fully automated for decades, if not centuries," Zachary Podkaminer of Construction Robotics, the New York-based company that developed SAM, told *Digital Trends* in 2017. "This is about collaboration between human workers and machines. What SAM does is pick up the bricks, put mortar on them, and puts it on the wall. It still requires a mason to work alongside it. SAM's just there to do the heavy lifting."

Robotics use in construction continues to make headway, though, as technology rapidly advances, and the need for new solutions to worker shortages remains strong. In limited instances, automated or semi-automated devices are already working alongside humans.

Nils Napp, an assistant professor at Cornell University's School of Electrical and Computer Engineering, and his students are studying

robotics for building and other applications. He said these examples of "cobots" — robots that are built to work alongside humans — are good at what they do, but they have limitations.

"Right now, SAM and others like that are useful at one thing," Napp pointed out. "Programming them to move on to a completely different function is a challenge that will have to be overcome. There is a lot of really cool theory on robot construction, such as using a large swarm of termite-inspired bots that work together to build a structure. In practice, application is difficult because the assumptions you need to make in order to develop the theories end up being really hard to map on physical robots."

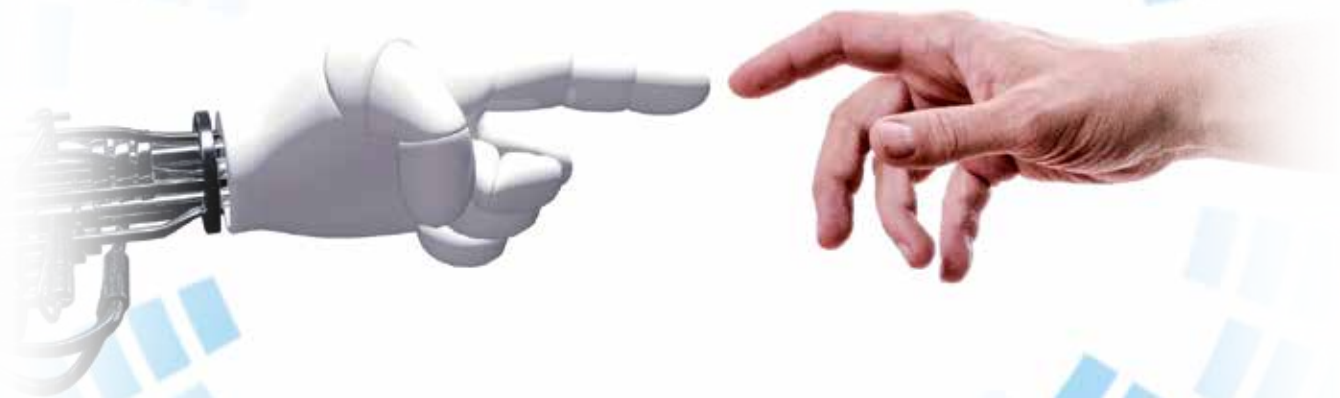
That may change as technology advances, according to Will Knight in *Wired*. The article talks about a robot drywaller built by Canvas that scans unfinished walls using lidar (light detection and ranging) or what's sometimes referred to as "laser scanning" and applies joint compound.

"It has long been impractical to deploy robots at construction sites because the environment is so varied, complex and changing," wrote Knight. "In the past few years, however, advances including low-cost laser sensors, cheaper robotic arms and grippers, and open-source software for navigation and computer vision have made it possible to automate and analyze more construction."

Increasing automation, analysis

Drones are also gaining prominence. Construction businesses are using them for tasks such as surveying, building models, tracking progress, recording data, billing,

Robot and human interaction is increasing in construction, but it is unlikely that robots will fully replace their human counterparts any time soon, according to industry experts.





Automation between humans and machinery is increasing job site efficiency. Drones and GPS technology are among the technologies making it happen.

measuring stockpiles and more. Drone usage in the construction industry has grown about 239%, according to a recent estimate.

Increased safety is another benefit of drone technology. Inspections in hazardous and/or remote areas can be done without putting personnel in harm's way.

"Simply put, drones enable us to provide needed views that are inaccessible, or otherwise too risky and expensive to capture by any other means," said Ryan Holmes, program manager of unmanned aircraft systems (UAS) for Multivista, in the ForConstructionPros.com article "Six Factors to Consider When Adding Drones to Your Construction Business." "We are using drones to help anywhere, from assessing land clearing and earthwork, insurance coverage, inspections, through to project completion and maintenance thereafter."

Proven and emerging technology

After site work has been done to prepare building pads and parking lots, robotics can come into play in building construction itself with 3D printing that allows machinery to be programmed to create practically any shape. A 3D-printed, two-story house recently won the German Design Council's German Innovation Award for its social, ecological and economical sustainability.

The house was printed with a mortar specifically designed for 3D printing by HeidelbergCement. "The printing of the residential house in Beckum is a milestone for 3D concrete-printing technology," said Dr. Jennifer Sheydt, head of engineering and innovation for HeidelbergCement. "We are convinced that this new type of construction will become an established standard in the years to come."

How many years down the road will depend on several factors, according to Napp. Among them are trust, acceptance and an open mindset to different building materials, such as double-insulated stacking blocks that he believes would optimize automation.

"Autonomous machines and GPS earthmoving are proven to work," Napp said. "A 3D-printed structure is also proven. An entire structure built by robots is different because you have to trust that the robots are correctly joining plumbing pipe and connectors so that they don't leak, for instance. We have that with humans. For now, the questions are there, such as would they meet code, can you even get a permit, are they fire and earthquake tested? If those, and others, can be overcome, then I believe there will be faster movement toward acceptance and someday having fully or near-fully robotic construction sites." ■

Editor's Note: This article is excerpted from a longer piece. For the full article, scan the QR code or visit <https://www.komatsu.com/en/blog/2021/top-reasons-why-robots-are-suited-for-construction-work/>



Looking for new talent? Tips to attract and retain Gen Z, the iGeneration

The construction industry is undergoing a transformation in its use of technology, and it's a change that could help far beyond the work site. For an industry continuing to face a shortage of workers long term, using technology to reach, recruit and retain our next generation of employees (right now, the target is Generation Z or "Gen Z") is a logical way to boost interest in construction careers. So, what can and should you be doing to reach this critical audience, and how can technology help bridge the gap?

Gen Z now makes up 30% of the global population and a quarter of the workforce. Born between 1996 and the early 2010s, these digital natives grew up during a time of rapid technological advancement and have never known a world without the internet. They embrace technology and look for businesses that do the same. Recent statistics show that 91% of Gen Z says that technology sophistication would impact their interest in working for a company.

"This generation is more adept at communicating than any that ever existed before," wrote Charlotte Nicol in the article "5 ways to attract and retain Generation Z talent." She notes that this generation has been using instant messenger applications,

social media and email since they were quite young. They've been honing their written communication skills for most of their lives, and it makes them "extremely valuable, especially in roles that require a high level of communication such as customer service, sales and marketing."

Use 'culture' technology

To promote your company and recruit new talent, turn to Gen Z's preferred social platforms, which include TikTok, Instagram, Snapchat and YouTube. Studies show that Gen Z spends nearly three hours per day on social media, which is more than any other generation. If you're looking for new recruits, it's imperative to have a strong social presence.

"Company's talent attraction efforts must be as digitally native as Generation Z," said Ryan Jenkins, Generation Z speaker and generations expert, in an article for *Inc.* He went on to say that "to reach next-generation talent pools, disrupt the prevailing models of talent attraction by using innovative technology." He encourages companies to have a strong presence on Indeed, LinkedIn and other top recruiting websites and mobile apps so that Gen Z can "discover their ideal employers."

Social media is a valuable recruitment tool because of its ability to target preferred candidates, wrote Albert Galarza, a member of Forbes Human Resources Council, in *Forbes*. He noted that beyond recruiting, social media can also support employee advocacy, in which your employees can help promote your company through their own channels. "By encouraging Gen Z workers to share content about your workplace culture and tagging it with a custom hashtag, you can attract other Gen Z candidates and continue to grow your talent pool."

Embrace work-from-home, remote tech

Companies that allow and trust employees to work remotely — at least some of the time, where possible — can be more attractive to younger generations. Over the past year and a half more people worked from home than

Technology that allows employees to work from home can be appealing to Generation Z.





Training tools that simulate operating equipment and other processes that use virtual reality and artificial intelligence are becoming more popular. Many in Gen Z grew up playing video games with similar characteristics, so they are adept with that kind of technology.

ever before because of the global pandemic. The move to work from home (WFH) showed that productivity doesn't suffer outside of the traditional office workspace. The cloud, virtual private networks and other technology, along with Wi-Fi and mobile devices, make this possible. While not feasible for field personnel who must run machinery and install utilities, the opportunity to WFH might be an incentive for traditional office and IT jobs, as well as other workers who only need to be on-site occasionally.

Technology to train

Using technology to train could be a selling point for many Gen Z workers and ease their onboarding. They are very "digitally literate," so using computers, simulators and/or virtual reality (VR) as training platforms makes sense and helps frame your company as modern.

"VR technologies are far beyond the stage where it's only gaming that can benefit from them," Catherine Strohanova, an expert in virtual reality applications, wrote in "4 Ways to Use Virtual Reality in the Construction Industry." "Virtual reality is slowly but steadily taking root in major industries like

the oil and gas sector, and the construction specialists have also found several beneficial ways of using VR."

Construction-specific technologies

Don't underestimate the value of an increasingly tech-enhanced site, as well. For a generation that grew up playing video games and maybe even got a drone for Christmas in the past 10 years, today's digitally enhanced work is an evolution from what some may view as a more traditional career choice.

New recruits will of course have to take the necessary courses and tests to become licensed pilots before they fly a drone over a site, but learning new technology hardware can be appealing to Gen Z.

Today's construction equipment is more sophisticated and technologically advanced than ever with bolt-on and built-in technology that captures data and uses it to control the machine. This technology virtually eliminates staking, saves time and material costs, and lets novice operators perform productively faster. While they still must learn how to properly move dirt, the machines offer the advantage of taking the guesswork out of getting to grade. ■

Editor's Note: This article is excerpted from a longer piece. To see it in its entirety, scan the QR code or visit <https://www.komatsu.com/en/blog/2021/tips-for-attracting-and-retaining-gen-z/>





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Design feature makes a difference in production

While you probably know that intelligent Machine Control (iMC) dozers, such as the D71i-24, can make operators more efficient, did you know that a simple design feature makes all of the D71-24 models more productive?

Komatsu specifically matched the blade width to the track gauge to ensure material is always cast outside the edges of the tracks for an optimal surface finish. Additionally, new performance features include greater steering power for improved maneuverability and productivity.

Insider Tip: "The D71-24 lets you cover multiple applications with one machine — from stripping, to pushing large loads, to finish grading — cutting your need for multiple pieces and saving you time and costs," said Andrew Earing, product marketing manager. ■



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