



Message From Our CEO



Landfills are being overwhelmed in the USA by the vast amount of waste generated daily. Innovative ways to accept, recycle, and create usable fuel from these waste streams – like cardboard, plastic, and paper – are being developed by one of PENTA’s clients. Working closely with this Client, PENTA has recently completed a new facility in Florida. The waste is received at the facility and converted to pellets. The innovative technology allows for the pellets generated from the waste stream to replace coal as fuel by providing an equivalent energy per pound. This is just one example of how PENTA’s environmentally conscious outlook is supporting clients in making our planet GREEN. PENTA’s staff

continues to support similar exciting, challenging and innovative technologies being developed by our clients in various industries.

PENTA will be attending the IEEE-IAS/PCA Cement Industry Technical Conference on April 28 – May 2 in our hometown, St. Louis. I would like to invite you to stop by our booth and meet our team. It will be a great occasion for all to exchange ideas and discuss opportunities to improve environmental sustainability in the industry.



And, two weeks later, May 13 – 16, PENTA will be attending the World of Coal Ash Conference at the St. Louis Union Station Hotel, which will be focused on the science, application and sustainability of worldwide coal combustion products (CCPs) as well as gasification products.

The following week, we will be attending the INTERCEM Shipping Americas Conference May 20-21 in New York City, to discuss shipping, logistics and handling for the cement sector with a focus on the handling of cement, clinker, GGBFS, fly ash and fuels.



*Subhash B. Mohan, P.E.
Chief Executive Officer
PENTA Engineering Corp.*

The Fact Is...

We are a company “of the world” as defined by our involvement in projects internationally, and a company “for the world” as we advocate for the protection of the environment. We study different possibilities and research various perspectives to develop GREEN solutions. PENTA is well-established, and always at the forefront of technology, which brings a great advantage in efficiencies and capabilities. One example of our contributions to a GREENER environment is assisting with the processing of ash from power plants as a raw material in the production of ready-mix concrete. Calcined ash is a pozzolanic material which partially replaces cement with a minimum generation of green-house gases. PENTA is providing design for plants that process combustion residuals from power plants and has carried out studies to utilize and transport fly ash. PENTA is active in other areas of sustainability, such as plants to reprocess dry combustible wastes, like paper and cardboard, into fuel for cement and lime kilns; and a plant to process industrial wastewater into clear effluent that can be returned to the environment meeting all clean water standards.

PENTA Projects

Waste Water Treatment System

PENTA is making America greener with many environmentally friendly projects and has been working in a variety of industries completing GREEN projects like waste water treatment, enviro fuels production from waste, wind mills, ash reclaim from coal-fired power plants, and waste heat recovery. PENTA works in many industries and in many geographical regions.

Case Studies:

- A municipality wanted to relocate a waste water treatment facility located on the banks of a river running near the center of a large city. The land will be converted into a city park and recreational area. To determine the cost to relocate the facility, PENTA created flowsheets of the process and generated an extensive equipment list. PENTA also had to determine piping requirements, electrical control devices and components, size of the building, the length of rail, square feet of pavement, silos, tanks, docks, etc. The existing facility needed to operate while



the new site was being constructed; therefore, the new site had to be built utilizing new equipment but replicating the process of the plant to be demolished.

PENTA completed 3D scanning of the entire facility, inside and out. This created a record of the existing facility and helped PENTA to make sure that all pertinent aspects of the facility had been accounted for. At the time of this writing, the new site is in the development stage.

- A client produces 2200 gallons per day waste water stream from an industrial mineral processing facility. The wastewater is currently pumped a considerable distance to a settling pond. The solids are dredged out periodically, which is a messy and expensive operation. PENTA eliminated the need for the settling pond by engineering a system to clarify the water so that it may be discharged to the municipal sewer main. The waste water treatment system was designed to meet the Code of Federal Regulations (CFR), as well as the city and state regulations prior to discharge into the sewage system.



PENTA's projects are planned with the environment in mind. With experience in so many different areas and industries, PENTA can select economical and GREEN solutions for its customers.

Design of a System to Transport Fly Ash

PENTA performed basic engineering services for the installation of a new fly ash handling system to dispatch over one million short tons of dry fly ash per year by rail and truck. Fly ash is currently ponded while it can be sold as a ready-mix concrete additive. The design was prepared accounting for plant operating and logistics requirements.

The fly ash handling system consists of an air slide system and bucket elevator, which transports fly ash from the existing fly ash silos to a new silo capable of loading both railcars and trucks simultaneously. Process equipment includes:

- New silo designed with adequate fluidizing air to allow for the transfer of dry fly ash to both the rail cars and trucks
- Bucket elevator, air slide(s), loading chutes, and dust collection equipment
- Associated air locks, flow control valves, and slide gates
- Electrical hardware and controls
- Rail scale and truck scale certified for federal trade
- Associated roads for truck traffic

PENTA's team performed 3D scanning of the facility and initiated surveying and a geotechnical study. PENTA also prepared the equipment list, equipment and silo specifications, plot plan, P&IDs and General Arrangements; structural and electrical designs; issued bid packages to vendors and subcontractors; evaluated

the bids and submitted a report to the Client, which included an EPC CapEx estimate and Project Execution Schedule.

[Read More about PENTA Projects](#)

Employee Spotlight

Two of our employees – both with a 5-year tenure – share their thoughts on PENTA as a workplace, their goals and their future outlook.

[Ketul Shah](#)

My Career at PENTA

Ketul Shah, PE was recently promoted to Engineer III in our electrical department. He is a key member of the design group and commissioning team known as a problem solver and mentor. He goes above and beyond the 'expected' to get the job done. Here is more from Ketul in his own words:

"Growing up in India, I was a kid who loved playing with machines. I knew then that I liked engineering but wasn't sure which discipline I wanted to pursue. After my first year at the university, I chose Electrical Engineering.

To further my education, in 2007, I moved to the United States and, in 2010, graduated from the University of Bridgeport, CT with an MS degree in Electrical Engineering. I held jobs as an Electrical Engineer for companies in Seattle, WA and Birmingham, AL. The best opportunity for growth came in 2013 when I was offered a position at PENTA. The challenges that I have been faced with have offered me the opportunity to use my skills and offer solutions to our clients. At PENTA, we are encouraged to think "outside the box" and come up with practical and viable ideas. This, I enjoy.

Encouragement came from work and family when I started considering getting my Professional Engineering license. I needed 26 additional university credits, which I thought was an almost impossible feat since I already had a full schedule. I put a tenacious plan together and juggled work, family, and a four-month assignment. In the end, I am happy to say, I passed the F.E. and P.E. in my first attempts.

My story is that of persevering and some sacrificing, which has paid off! My outlook on the future is one of continuous success, and I know that right now I am in the right place to succeed.

I enjoy spending time with my wife, son and daughter. When not busy with work and family, I play cricket or a good game of chess."





Steve Burns

A vocation realized...

I was introduced to drafting in 2001 when I was 15. After two years in my high school's vocational drafting program, I knew I had found what I wanted to do for a living. I went on to earn an Associate of Applied Science degree in Architectural Engineering Drafting Technology.

While working for a manufacturing company for a short time, it became apparent that the limited design work and vast amounts of data entry were not for me. I realized that I wanted a career in 3D. My job search led me to PENTA Engineering. I knew PENTA was different from other firms when I learned they were using Revit because 3D modeling provides a better project for their clients.

I joined PENTA as a 3D Designer in 2013. I've been at PENTA for over five years now, and I've been promoted from a Structural Revit Designer to the company's BIM Manager. Today, we work in a full 3D environment with up-to-date terrestrial and drone-based point cloud scan data. I manage the modeling and drafting standards, hardware and software procurement, and (my favorite) inter-discipline collision resolution. Inter-discipline collision detection allows us to find modeled conflicts early in the process. It also allows us to make smaller more fluid changes to the project as the design progresses saving everyone time and money.

PENTA takes pride in investment in technology and in their employees. My job allows our firm to lead the way in ensuring the best possible designs for our clients.

Interested in joining our team? [Learn more about career opportunities with PENTA](#)

PENTA Bulletin

Use of Drones for visually based inspections

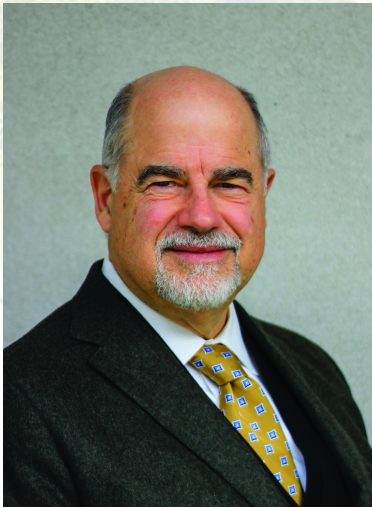
Christian Benavides has obtained renewal of his UAS Part 107 Commercial Pilot Certification, which marks his two-year anniversary of flying drones for PENTA Engineering.

In conjunction with PENTA's terrestrial 3D Scanning program, Christian uses a DJI Drone and processing through DroneDeploy to create photogrammetry-based data. From this data, PENTA can create accurate topography maps, and 3D point clouds that can be combined with laser scanned data.





In addition to photogrammetry-based mapping, PENTA uses drones for visually based inspections in difficult or expensive to access locations, such as stacks, ductwork, silo walls and towers and develops 3D point clouds with drone technology. [Read More about our Services](#)



Staying in touch with his Alma Mater

Frank Benavides, Principal Consultant at PENTA, is a believer in education and in contributing to Missouri S&T where he attained his engineering degree. Frank is a welcomed visitor and has been invited by the university to speak to faculty professors and students. He has been recognized with a Professional Degree and has been elected to the Academy of Civil Engineers. Frank recently visited the research laboratories of the University with a group of PENTA's consultants to view the work being done by professor Dr. Mohamed ElGawady and his graduate students on the use of fly ash for strengthening concrete. [Click Here](#) to read about the research carried out to improve sustainability in the construction industry.

Engineers Week at PENTA

PENTA celebrated Engineers Week, February 18-22. We kicked off the week with a tribute to the entire staff highlighting specific strengths of each PENTA employee. To recognize the revolution and progress engineering has brought to the world, we showed the movie "Dream Big, Engineering Our World" during lunch. The movie was made as the first STEM initiative aimed to inspire kids to pursue a career in engineering. We wrapped up the week with a staff favorite, potluck lunch paired with engineering-related trivia. We are proud of our engineers and the entire staff who supports PENTA's world-class innovation.

