

George E. Hlavacs, P.E.

Sr. Vice President

Expert Witness

George E. Hlavacs, P.E., an owner of the Company, is a Sr. Vice President and a Sr. Project Manager in the metals, energy, manufacturing, refining, chemicals, commercial and automotive industries. As a Professional Civil and Structural Engineer, he has led projects in industry and government, with local, national, and internationally placed clients. With over 40 years of engineering experience, Mr. Hlavacs leads the staff with the knowledge and skills needed to meet the demands of Middough clients in the public and private sectors.

He joined Middough in 1963 while a student at Cleveland State University, learning the business of engineering, working on site development, foundations, towers, tunnels, shoring, conveyor systems, mill, furnace and finishing shops and other related structures and systems. His vast knowledge of engineering in all its phases is without peer.

Recent Experience

CSX Toledo Terminal

Designed lakefront dock repairs

Gerdau-Ameristeel, Jacksonville, FL

Preliminary engineering and estimates for a new electric furnace shop and caster, new scrap yard and bar mill upgrade

Engineering analysis for melt shop upgrade with a new electric furnace and continuous caster

P.U.C.O. bridge inspections for 21 railroad bridges in Ohio

Marathon-Ashland Oil Refinery, Canton, OH

Checked designs for third stage catalyst separator support structure and designed supports for 30" diameter, 700° F vapor recovery lines.

Premcor Refinery, Lima, OH

Engineered new pipe support bents for the waste water treatment and Trolumen areas

BP Oil Toledo Refinery, Ohio

Engineered rebuild of the main raw water intake and pumphouse

North Star Steel, St. Paul Park, MN

Foundation design for new caster and turret

Fedex Terminal Facility, Woodbridge, NJ

Review plumbing, piping and paving deficiencies and causes

Registration

Professional Engineer in the States of OH, MI, GA, AL, AZ, CO, IA, KS, KY, MN, NJ, NC, PA, RI, SC, TX UT and WV

Education

BS, Civil Engineering, Cleveland State University, Cleveland, OH

Advanced Studies, Structural Engineering, Case Institute of Technology

Notable design and management project skills:

- Cooling water systems
- High-pressure steam distribution
- Industrial wastewater treatment
- Equipment support structures
- Waste heat recovery
- Co-generation plants
- Pressure vessel supports
- Pipe galleries
- Water circulation systems
- Railroad and highway bridges
- Retaining walls
- Storm water retention
- Settling ponds
- Overhead crane systems
- Precipitators
- Baghouses
- Hazardous waste water systems
- Sanitary and storm sewers
- Retaining structures
- Transmission towers
- Substations
- Site selection
- Commissioning
- Structural inspections

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Chemical Experience

Mr. Hlavacs has managed and designed equipment support structures, large dust collection and ductwork systems for both hot and cold gases, solids and gas incineration, waste heat recovery systems, complete reheat furnace design and water treatment systems and steel process and equipment selection and layout including hot metal through rolling.

BP Oil Project Engineer/Manager for waste heat recovery system (air preheaters) for: refinery crude heater (60,000,000 BTU/hour), two lube plant furnaces (3,000,000 BTU/hour each), and acrylo off-gas incinerator with a 140,000 pound per hour waste heat boiler.

AK Steel Structural and ductwork design engineer for waste heat boiler installation on rotary hearth furnace.

Handy & Harmon Project Manager for precious metal recovery system (gold, platinum, silver, etc.). Designed incinerator, fume scrubber, water treatment (settling, thickening and belt press) to recover solids from reject printed circuit boards.

General Electric Project Structural Engineer for varnish plant framing and vertical treater installation for resin coating of fabrics and laminating with various epoxies and metals for use in printed circuit board production.

TRW Project Manager for new turbine overhaul facility located in Singapore. Work included development of basic design and requirements, project budget and schedule, design engineering, complete construction management, contract administration and control, start-up and commissioning of production equipment and pollution control including three dust collection systems, one fume collection and scrubbing system and a wastewater treatment system for removal of heavy metals and acids.

AK Steel Project Engineer for equipment installation engineering and building structure revamp for an argon-oxygen-degassing facility.

Premex Structural Design Engineer for pressure vessel support structures and pipe galleries on a Premex expansion and two urea plants.

BP Chemical Project Engineer for the chemical plant hazardous waste water treatment facility from conceptual through PFD, P&ID, detail design and start-up. System contained 500,000 gallon equalization tank, two 1 million gallon double-walled surge tanks, electrolyte mixing and injection, clarifier, sand filters and backwash system, sludge handling and presses and deep well pumps and associated piping, everything had secondary containment.

BP Chemical Project Engineer for acrylo off-gas incinerator system

Training Courses:

Substation and High Voltage
Transmission Tower Design

Waste Heat Recovery

Affiliations

ASCE, American Society of Civil
Engineers

Cogeneration Institute of AEE
(Association of Energy Engineers)

CEA, County Engineers
Association of Ohio

ACI, American Concrete Institute

AISC, American Institute of Steel
Construction

AIST, Association for Iron and
Steel Technology

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including steam pre-heaters, waste heat recovery boiler (75,000 pound per hour and 750°F, 750 psf), boiler feed water system including de-aerators, softeners and pumps.

Great Lakes Steel Project Manager and Structural Engineer for two sinter plant re-builds including new wind boxes and primary and secondary gas cleaning using both multi-clones and gravel bed filters. Ductwork was 15 ft. in diameter and fans were 2000 HP.

Atlantic Steel Company Project Manager for \$80 million mini-mill including layout and material handling for electric furnace/caster shop, billet yard, bar mill and support facilities. Designed walking beam billet re-heat furnace and mill scale handling system for facility and electric furnace canopy/4th hole dust capture system.

Atlantic Steel Company Project Manager and Structural Engineer for complete walking beam furnace design including breeching, stacks and combustion system.

Great Lakes Steel Project Manager for 80" hot strip mill wastewater treatment system including ROT water, scale pit water and flume flushing water and design of settling pond system.

Great Lakes Steel Project Manager and Structural Engineer for wet flue dust recovery and complete water recirculation system for the four blast furnaces at one facility including vacuum filters, clarifiers, thickeners and sludge handling facilities.

Atlantic Steel and **LTV Steel** Project Structural Engineer for multiple primary and fugitive emission dust capture systems in both electric furnace and basic oxygen furnace shops. Large ductwork (over 15' in diameter) was included on these projects.

EW Bliss Project Manager for mill builder heavy erection shop, finished coil warehouse shipping building, electric furnace shop building, and BOF building extension, as well as foundation and designs for 19 rolling mills of various types and sizes. Also responsible as project engineer for all installation engineering on 12 mills.

PCS Chemicals Project Manager for new 800 lb. steam distribution system in ammonia plant.

BCS Chemicals Project Manager for urea granulator vent scrubber system including wastewater handling and hot ductwork.

BP Chemicals Project Director for a catalyst plant fugitive emissions dust control system.

BP Chemicals Project Director for over 200 miscellaneous projects in an acrylo nitrile plant; products varied in size from \$10,000 to \$1 million in engineering fees.

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Civil Engineering Experience

Mr. Hlavacs has civil engineering experience with metal facilities, including palletizing plants, sinter plants, blast furnaces, electric and basic oxygen furnaces, mill building sand support facilities including substation design, water pumping, cooling and treatment systems, pipe expansion analysis and pipe bridges, railroad bridges and highway bridges, retaining walls, site selection and design of site improvements and structural inspections.

TRW, Singapore Project Manager for new turbine overhaul facility. Project included development of basic design and requirements, project budget and schedule, site selection and layout, complete construction management and control, start-up and commissioning of equipment including four dust collection systems and a wastewater treatment system.

Greater Cleveland Regional Transit System Design Engineer for temporary railroad bridge crossing used during construction of rapid transit rail expansion to Cleveland Hopkins Airport. Also designed concrete tunnel for transit entrance to this airport terminal.

Ohio Department of Transportation Design Engineer for miscellaneous retaining walls. Developed elevations and screed heights for interstate highway bridge deck on super-elevated curve.

Luria Bros. Project Engineer for greenfield car shredder facility including 20-acre site development with grading, access roads, railroad spur, drainage and creek culverts, all utilities and plant requirements.

Air Products Project Manager for design of argon, nitrogen and hydrogen cross-country pipeline through the industrial flat area of Cleveland, Ohio including easements, right-of-way and permits.

Atlantic Steel Project Engineer and Manager for mini-mill including 241 acres of site development, access roads and railroads, scrap storage yard and site drainage including two 6-acre water ponds.

Great Lakes Steel Project Engineer for fugitive emission dust capture systems in one sinter plant, two electric furnace shops and a basic oxygen furnace shop. Systems included capturing dust at transfer points, furnace vessels, hot metal transfer points and burning stations.

Great Lakes Steel Project Engineer for two sinter plant rebuilds including new wind boxes, and primary and secondary gas cleaning using both multi-clones and gravel bed dust filters. Work involved ductwork that was 15 ft. in diameter, 95 ft. above ground and two fans at 2000 HP each.

Great Lakes Steel Project Engineer for 80" hot strip mill wastewater treatment system including ROT water, scale pit water and flume

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flushing water, and design of settling pond system, including site improvements and development.

Great Lakes Steel Project Engineer for wet flue dust recovery and complete water recirculation system for the four blast furnaces at one facility including vacuum filters, clarifiers, thickeners and sludge handling facilities.

EW Bliss Design Engineer for building structures and foundations for 72,000 sq. ft. heavy erection and machine shop including three aisles, 200-ton capacity cranes and 40'-0" floor to crane rails. Project included all support facilities and offices.

BP Chemicals Project Engineer for chemical plant hazardous waste water treatment facility from conceptual through PFD, P&ID, detail design and start-up. System contained 500,000 gallon equalization tank, two 1,000,000 gallon double walled surge tanks, electrolyte mixing and injection, clarifier, sand filters and backwash system, sludge handling and presses and deep well pumps and associated piping. Everything had secondary containment.

BP Chemicals Project Engineer for acrylo off-gas incinerator system including steam preheaters, waste heat recover boiler (75,000 PPH, 750°F, 750 PSF), boiler feed water system including de-aerators, softeners and pumps.

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Environmental Experience

Mr. Hlavacs has been involved in projects for municipal and industrial wastewater collection, pumping, cooling and treatment systems, including sludge and slurry handling. His work includes organic streams such as bar racks, DAF systems and digesters as well as metal facilities including palletizing plants, sinter plants, blast furnaces, electric and basic oxygen furnaces, continuous casters, slab and billet rehear furnaces, hot strip mills, multi and single-stand cold mills, manufacturing buildings, mill buildings and support facilities.

Great Lakes Steel Project Engineer for 5.5-mile sanitary sewer system on Zug Island through existing plants, utilities, and abandoned foundations, including coordination and monitoring of construction. System contained nine lift stations and drop tie-in to 115 foot city main.

Great Lakes Steel Project Engineer for wet flue dust recovery and complete water recirculation system for the four blast furnaces at one facility, including vacuum filters, clarifiers, thickeners and sludge handling facilities.

Handy & Harmon Project Engineer and Manager for precious metal recovery system (gold, platinum, silver). Designed incinerator, fume scrubber and water treatment (settling, thickening and belt press) to recover solids from reject printed circuit boards.

BP Oil Project Manager for study and redesign of three fuel handling terminals, oil water separators, holding pond and dike area pumping stations. Detailed design included storm water collection system modifications, addition of oily water pump, revision of process flow sheets, redesign of OWS and design of new gravity separator to handle dike storm water.

BP Oil Project Engineer on two 8 million gallon in-ground storm water retention tanks with floating roofs and diversion sewers.

BP Chemicals Project Engineer for chemical plant hazardous waste water treatment facility from conceptual through PFD, P&ID, detail design and start up. System contained 500,000 gallon equalization tank, two 1-million gallon double-wall surge tanks, electrolyte mixing and injection, clarifier, sand filters and backwash system, sludge handling and presses, and deep well pumps and associated piping. Everything had secondary containment.

Great Lakes Steel Project Engineer for two sinter plant rebuilds including new fluidized bed reactors, wind boxes, primary and secondary gas cleaning using both multi-clones and gravel bed filters. Ductwork was 15 feet in diameter, and fans were 2000 HP. Coordinated design of instruments and controls.

TRW Project Engineer and Manager for new turbine overhaul facility

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located in Singapore. Work included development of basic design and requirements, project budget and schedule, design engineering, complete construction management, contract administration and control, startup and commissioning of production equipment and pollution control including three dust collection systems, a fume collection and scrubbing system and a wastewater treatment system for removal of heavy metals and acids including settling, thickening, slurry handling belt press and sludge storage.

Great Lakes Steel Project Engineer and Manager for 52,000 GPM, 80" hot strip mill wastewater treatment system including ROT water, scale pit water and flume flushing water and design of settling pond system with automatic monitoring equipment before discharge to the Detroit River.

Atlantic Steel Co. Project Engineer and Manager for \$80 million mini-mill including layout and material handling for electric furnace/caster shop billet yard, bar mill and support facilities. Designed walking beam billet reheat furnace and mill scale collection and handling system for this facility as well as plant water, city water, service water and sanitary systems.

General Electric Project Structural Engineer for varnish plant framing and vertical treater installation for resin coating of fabrics and laminating with various epoxies and metals for use in printed circuit board production.

BP Oil Project Engineer and Manager for waste heat recovery system (air preheaters) on refinery crude heater, (60 million BTU/hour) and two lube plant furnaces (3 million BTU/hour each). Performed same function for an acrylo off-gas incinerator with a 140,000 PPH waste heat boiler.

Atlantic Steel and **LTV Steel** Project Engineer and Manager for various primary and fugitive emission dust capture systems in both electric furnace and basic oxygen furnace shops and a catalyst plant.

BP Chemicals Project Engineer for acrylo off-gas incinerator system including steam preheater, waste heat recover boiler (75,000 lbs/hr, 750°F, 750 PSF), boiler feed water system including de-aerators, softeners and pumps.

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Heavy Industry Experience

Mr. Hlavac's projects involved primary metal facilities including bulk material storage, palletizing plants, sinter plants, blast furnaces, electric and basic oxygen furnaces, continuous casters, slab and billet re-heat furnaces, hot strip mills, multi and single stand cold mills, mill buildings and support facilities including machine shops, substation design, water pumping, cooling and treatment systems, pipe expansion analysis and pipe bridges. Responsible for in-house and client coordination, basic engineering layouts and design concepts, as well as installation engineering drawing production.

Atlantic Steel Co. Project Manager for mini-mill including layout and material handling for electric furnace/caster shop, billet yard, bar mill and support facilities. Designed walking beam billet re-heat furnace and mill scale handling system for this facility and canopy and furnace 4th hole dust capture system. Designed baghouse and ductwork structural modifications on this system to double the air handling capacity of the dust collection system.

J&L Steel Project Engineer and Designer for all foundations for two slitting and side trimming lines. Coordinated electrical, piping and support facilities.

Midwest Steel Project Engineer and Designer for all foundations for electrolytic cleaning line. Coordinated electrical, piping and support facilities.

J&L Steel and **Sharon Steel** Project Engineer and Designer for all foundations for two shear lines. Coordinated electrical, piping and support facilities.

Kaiser Steel Project Engineer and Designer for all foundations for galvanizing line. Coordinated electrical, piping and support facilities.

Atlantic Steel Project Engineer and Designer for all foundations for Kocks rod mill (31 stands). Coordinated electrical, piping and support facilities.

Atlantic Steel Project Engineer and Designer for all foundations for Moeller-Neumann bar mill (19 stands). Coordinated electrical, piping and support facilities.

Atlantic Steel Project Engineer and designer for all foundations for Morgan vertical roughers, finishing and no-twist mill (17 stands). Coordinated electrical, piping and support facilities.

Revere Copper Project Engineer and Designer for all foundations for Lowey mill and two bliss finishing mills. Coordinated electrical, piping and support facilities.

HYLSA Project Engineer and Designer for all foundations for two bliss hot mills and a five stand mill rebuild. Coordinated electrical, piping and support facilities.

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AK Steel Project Engineer and designer for all foundations for HSM 5th stand additional and new delivery system. Coordinated electrical, piping and support facilities.

Beckley Coal Co. Structural Engineer for coal mine underground development, layouts, shafts, shoring, conveyer systems, storage bins, silo and load out system.

Great Lakes Steel Project Engineer for fugitive emission dust capture systems in a sinter plant, two electric furnace shops and basic oxygen furnace shop. Systems included capturing dust at transfer points, furnace vessels, hot metal transfer points and burning stations.

Atlantic Steel Project engineer for complete walking beam furnace design including breaching, stacks, a combustion system and walking beam mechanical equipment.

BP Oil Structural Design Engineer for waste heat boiler installation including flue gas breaching and supports and boiler house structures.

LTV Steel Inspector and structural engineer for coke plant coal handling system rehabilitation project. Included barge unloader, transfer hoppers, conveyors and coal bunkers.

Great Lakes Steel Project Manager for a desulphurization station fume collection system including hood ductwork baghouse and necessary supports.

Great Lakes Steel Project Engineer for two sinter plant re-builds including new wind boxes and primary and secondary gas cleaning using both multi-clones and gravel bed dust filters. Ductwork was 15' in diameter, 95' above ground and 2 fans at 2000 HP each.

Great Lakes Steel Project Engineer for 80" hot strip mill wastewater treatment system including ROT water, scale pit water and flume flushing water and design of settling pond system.

Great Lakes Steel Project Engineer for a wet flue dust recovery system and complete water recirculation for four blast furnaces at one steel facility.

EW Bliss Design Engineer for 72,000 sq. ft. heavy erection and machine shop which included three aisles, 70 ft. wide by 320 ft, 200 ton capacity cranes, and 40' floor to crane rails. Project included all support facilities and offices.

AK Steel Structural Engineer for equipment installation engineering, foundations and building structures for an argon-oxygen-degassing facility.

LTV Steel Design Engineer for finished coil warehouse and shipping building, compressor, pumphouse and locker room facilities, electric furnace shop building, and BOF building extension.

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Atlantic Steel and LTV Steel – Project Engineer for various primary and fugitive emission dust capture systems in both electric furnace and basic oxygen furnace shops.

LTV Tubular Structural Design Engineer for waste heat boiler installation on rotary re-heat furnace.

Luria Bros. Inc. Project Engineer for car shredder facility including site preparation, railroad track layout, truck refueling station, 9,600 sq. ft. equipment maintenance and storage building, 4,800 sq. ft. operations office building, substation and all equipment foundations, piping and electrical to install the 3,500 HP shredder, material handling and pollution control.

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