Engineering Excellence since 1866




JMH JOHN M HENDERSON

WHO WE ARE

MARKET LEADERS AND INNOVATORS

For almost 150 years, John M Henderson have been delivering Excellence in Engineering Design, Manufacturing and Installation, gaining worldwide reputation as market leader and innovator.

John M Henderson has manufactured equipment for a diverse range of industries and customers since 1866. This includes equipment for the Ministry of Defence, the Entertainment Industry, Ship Builders, Steel Industry, Slipways, Winches, Mechanical Handling Equipment and a wide range of equipment for the Oil Industry.

John M Henderson's main specialty today is Coke Oven Machinery, which have been successfully designed, manufactured and installed for over 60 years.

Forth Bridge Construction Cranes, UK, 1959

Helicopter Landing Pad Simulator, UK, 1994

JMH Pusher Machine, UK, 1960

JMH Pusher Machine, Korea, 2008

John M Henderson have been delivering Excellence in Engineering Design, Manufacturing and Installation since 1866, gaining a reputation for supplying environmentally friendly and reliable equipment, designed to each customer's specific requirements.

COKE OVEN MACHINERY

WHAT WE DO

World Class Engineering

John M Henderson has distinguished itself as one of the World-wide Leaders in Design, Manufacture and Installation of Coke Oven Machinery over the last 60 years.

More than 200 Machines including Screwfeeder Charge Cars, Mass Flow Charge Cars, Pusher Machines, Transfer Cars, Coke Side Machines, Locomotives and Coke Quench Cars have been successfully designed and installed all over the world.

Manless. Smokeless. Reliable.

John M Henderson Coke Oven Machines deliver a powerful combination of Fully "Manless" Automation with Total Environmental Control, with each machine specially tailored to meet the customer's specific requirements.

Complete Coke Oven Machinery Solutions

John M Henderson provides the complete solution set of Coke Oven Machinery:

- Charge Cars
- Pusher Machines
- Transfer Cars
- Coke Side/Hood Machines
- Locomotives
- Quench Cars
- Waterjet Door Cleaners

Coke Transfer Car, Posco, Korea

Charge Car, Corus, UK

Pusher Machine, Posco, Korea

A PROUD TRACK RECORD

John M Henderson strongly believes that the best technical solutions are developed when the company and customers work closely together.

This interaction combines John M Henderson long term proven expertise with customer specific requirements, therefore providing reliable custom designed equipment.

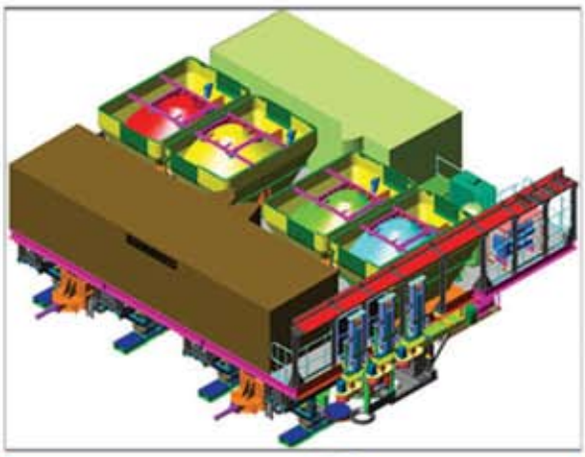
- **140+** Years Experience in Engineering Design, Manufacturing & Installation
- **60+** Years of Research and Development Innovation in Coke Oven Machinery
- More than **200** Coke Oven Machines successfully completed for more than 30 worldwide customers

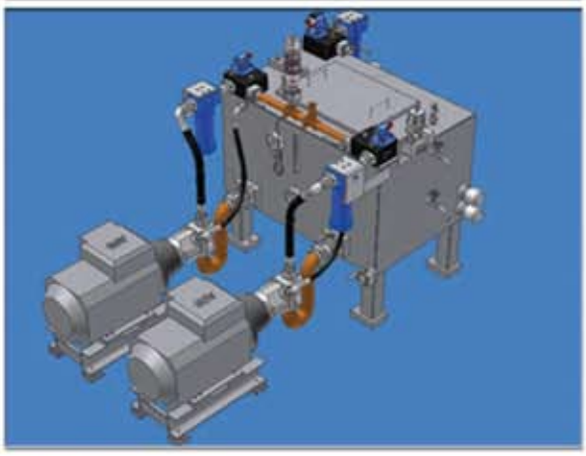
Over the last 60 years John M Henderson has successfully engineered, manufactured, installed and commissioned coke oven machinery at coke plants all over the world:

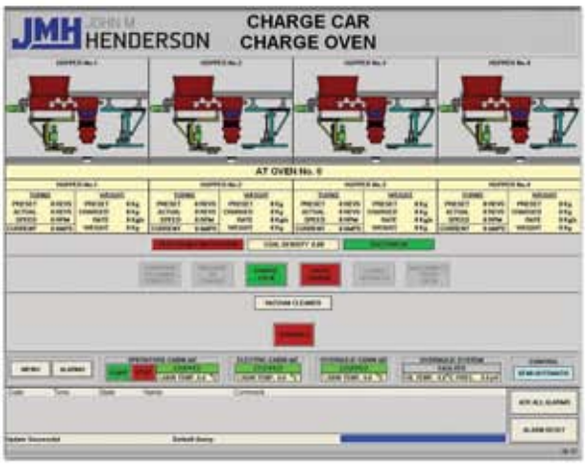
- ArcelorMittal Zenica, Bosnia and Herzegovina
- Italiana Coke, Italy
- Posco, Korea
- Monckton Coke and Chemicals, UK
- Gerdau Acominas, Brazil
- Usiminas, Brazil
- Lucchini, Italy
- Arcelor Mittal (Dofasco), Canada
- Tata Steel (Corus), UK
- Sahaviriya Steel Industries, UK
- Ternium Siderar, Argentina,
- US Steel (Stelco), Canada
- ArcelorMittal Dunkerque (SOLLAC), France
- ArcelorMittal (CST), Brazil
- US Steel (VSZ), Slovakia
- BHP Australia
- AK Steel, USA
- TISCO, India
- ISCOR, South Africa
- ZISCO, Zimbabwe
- SAIL, India

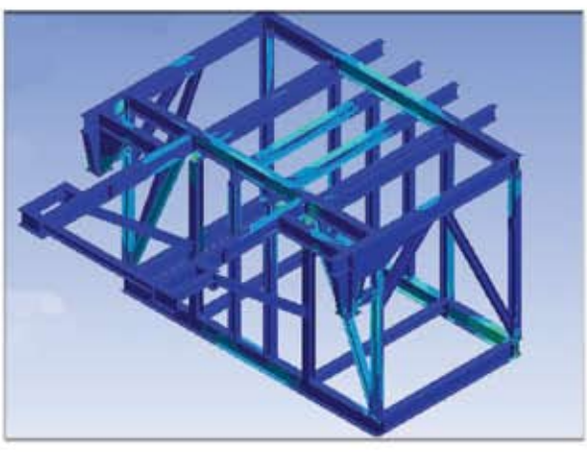
STATE-OF-THE-ART TECHNOLOGY

60 YEARS OF R&D INNOVATION









The Best Available Coke Oven Machine Technology

More than sixty years of Research and Development innovation has enabled John M Henderson to develop the Best Available Technology for Coke Oven Machines.
The JMH Coke Oven Machine is the complete machine, totally automated to maximize productivity, equipped with state-of-the-art environmental protection systems and tailored to the unique requirements of each coke plant.
All John M Henderson projects are designed in-house including the Mechanical, Automation and Fluid Engineering. The engineering design covers the complete development work through manufacturing, installation and commissioning.

Mechanical and Structural Design

The Mechanical and Structural engineering designs are carried out in accordance with recognised national and international standards.
All projects are custom designed to suit the client's particular specifications, with projects completed to EN, DIN and ASTM Standards.

Hydraulic and Pneumatic Design

The design and build of the power units, manifold assemblies and piping circuits involves the use of standard proprietary equipment. Special purpose equipment can also be built to suit a particular environment or customer requirements.

Electrical and Automation Design

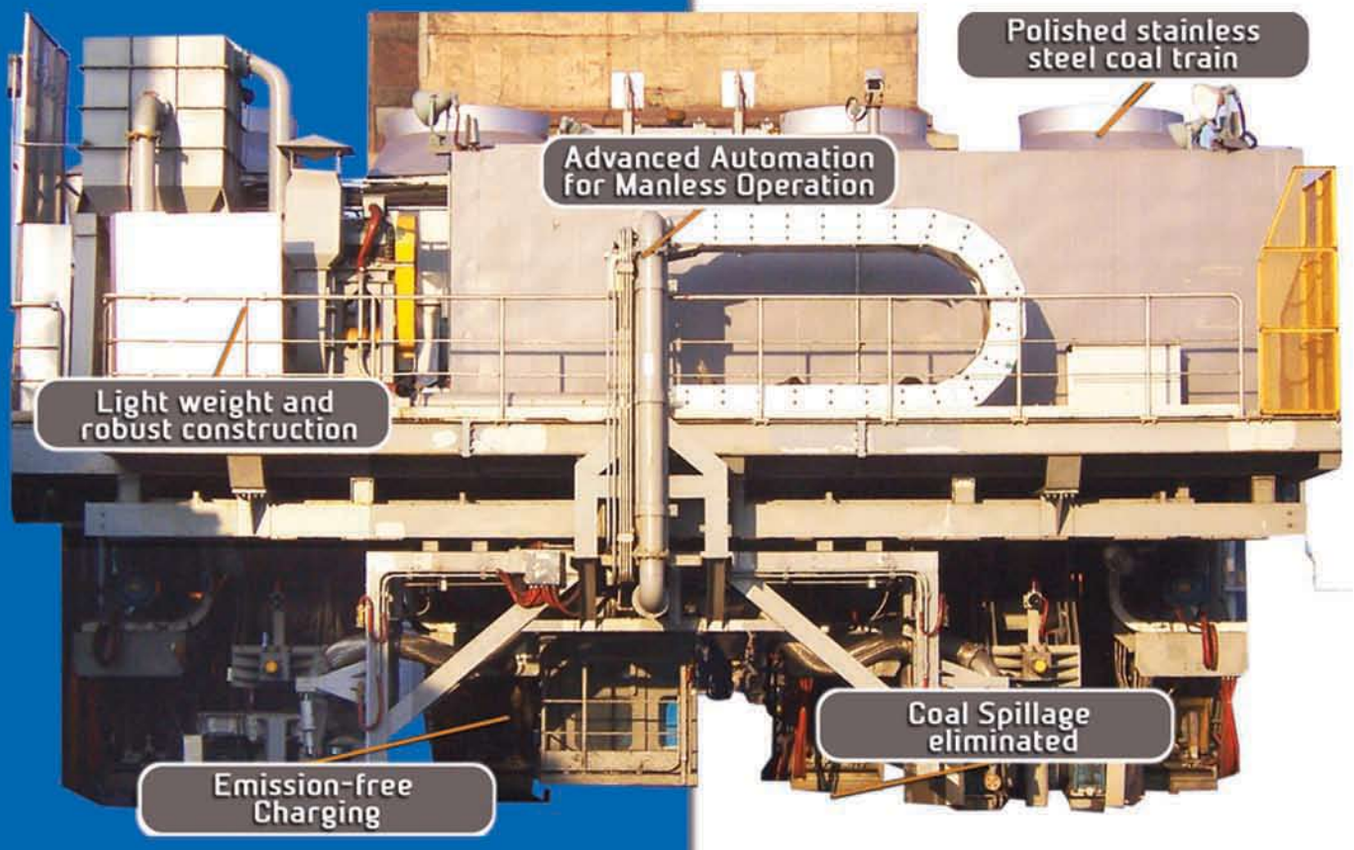
JMH covers the complete design of the electrical and automation systems incorporating AC & DC switchgear, inverter drive systems and PLC controls with modern machine interfaces that use touch screen technology and telemetry systems.
Where practical, the installation of electrical equipment and cabling can be carried out in the factory for a final testing of the end product.

Engineering Design Software

The Designs are produced using the latest 4D Methodologies utilizing Autocad and Autocad Inventor.
The mechanical, structural and thermal design analysis is undertaken using Ansys Finite Element Analysis software.

CHARGE CARS

SMOKELESS, EMISSION-FREE CHARGING



The John M Henderson Charge Car is widely recognized as the Best Available Technology for charging an oven, because of its solid combination of pollution control performance, maximum reliability, ease of maintenance and cost-effectiveness. The JMH Screwfeeder Charge Car eliminates all charging emissions and coal spillage incidents, which are a major cause of concern for coke plant operators.
At the heart of the design is the JMH Telescope System, which is installed on all new Screwfeeder Charge Cars and has also been successfully retrofitted on a number of existing cars around the world.
The main features of the John M Henderson Charge Car are:

- Emission Free Charging
- Zero Coal Spillage
- Polished Stainless Steel Coal Train
- Charging by Density to Maximise Production
- Advanced Automation for Manless Operation
- Light Weight and Robust Construction for Battery Preservation

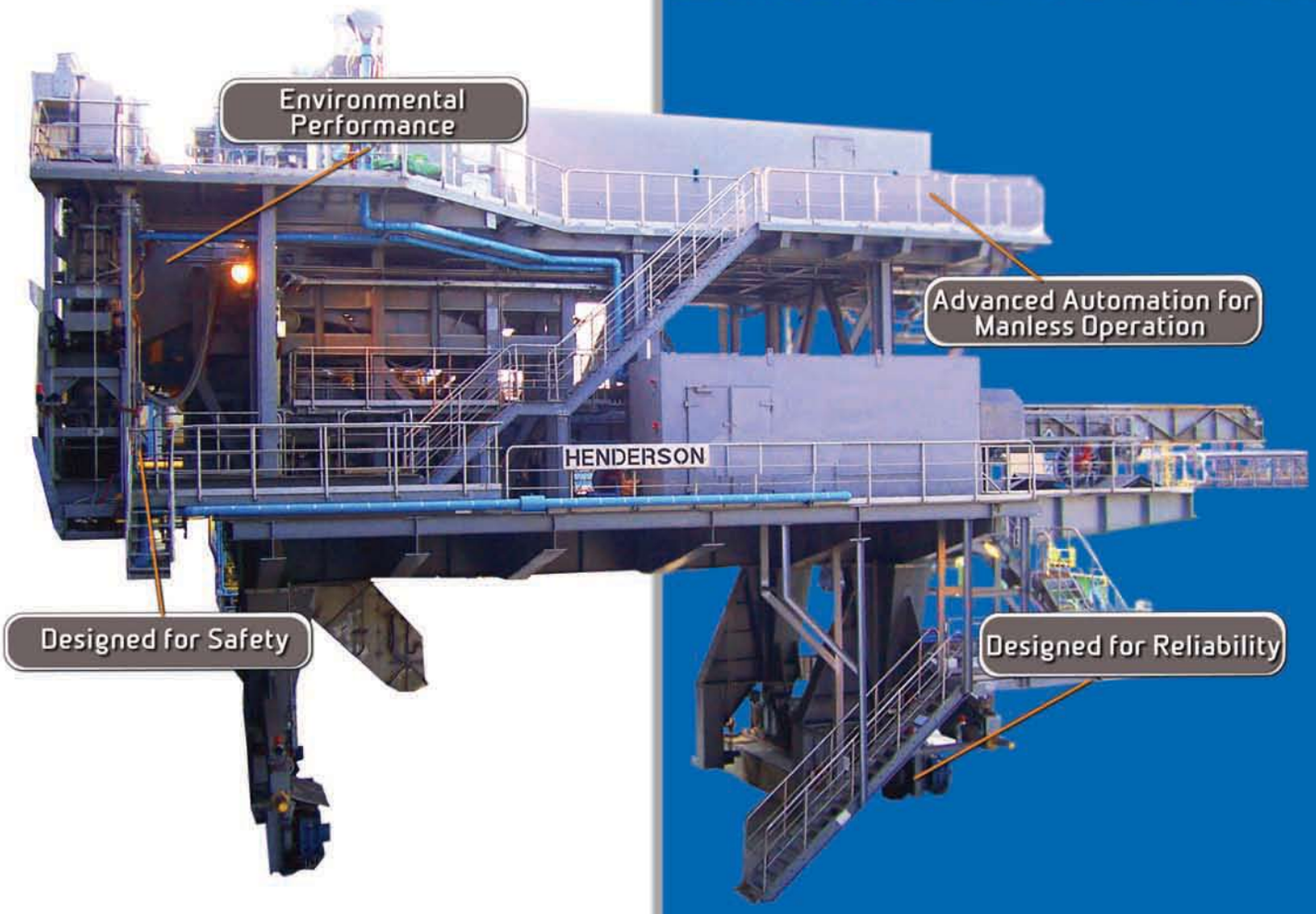
The John M Henderson Charge Car typically comprises:

- Hopper
- Screwfeeder
- Telescope
- Weighing System
- Lid & Frame Cleaners
- Automatic Lid Sealing
- Ascension Pipe Operator
- Ascension Pipe Cleaner
- Gooseneck Cleaner
- Charge Hole Boring Tool
- Oven Top Vacuum Cleaner
- Automatic Positioning System

Over the past decades John M Henderson has designed, manufactured and installed more than 50 Charge Cars all over the world.

PUSHER MACHINE

STATE-OF-THE-ART EMISSION CONTROL



John M Henderson Pusher Machines are at the cutting edge of the Coke Oven Equipment Technology. They are designed for Reliability, Longevity, Maximum Safety and Environmental Performance, and incorporate Advanced Automation for Manless Operation.

The JMH Pusher Machines are designed for single spot operation and have the Ram Beam and Leveller Beam configured to suit battery operations. They can be equipped with a combined Power and Fibre Optic Cable Reel to ensure excellent reliability of the communications via the Fibre Optic Cores.

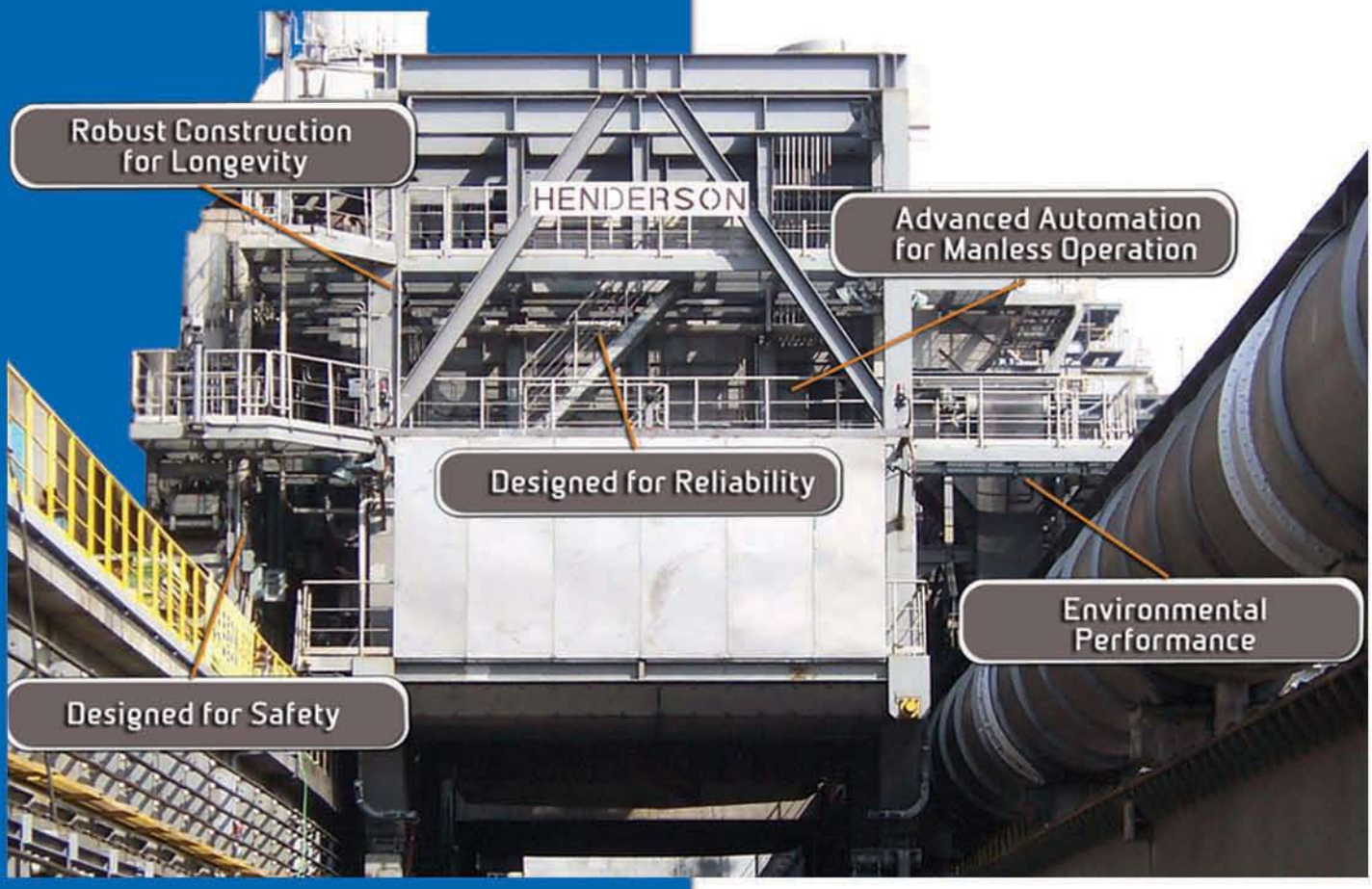
Over the past decades John M Henderson has designed, manufactured and installed more than 30 Pusher Machines for worldwide coke operators.

In addition to the Ram Beam, Door Extractor and Leveller Beam, the John M Henderson Pusher Machine incorporates:

- High Pressure Water Jet Door Cleaner
- Jamb Cleaner
- Leveller Smoke Sleeve
- Leveller Door Operator
- Coal Spillage System
- Coke Spillage System
- Bench Safety Barriers
- Emission Control System
- Automatic Positioning System
- Power and Fibre Optic Cable Reel
- Counter Thrust Device to resist the forces of the pushing operation.




TRANSFER CARS
"ZERO EMISSION" TECHNOLOGY



John M Henderson Transfer Cars are designed to satisfy the toughest environmental regulations and integrate state-of-the-art design innovations which make them world leaders in emission control.

JMH designs incorporate great flexibility, allowing them to suit the precise requirements of each battery. The machines are fully integrated into automated control systems, allowing for Manless operation. In conjunction with other JMH Coke Oven Equipment, John M Henderson Transfer Cars are the best available solution for efficiency, environmental control and longevity.

Over the past decade, John M Henderson has designed, manufactured and installed more than 10 State-of-the-Art Transfer Cars in Canada, Brazil, Italy and Korea.

The John M Henderson Transfer Cars incorporate:

- Coke Guide Cage
- Intelligent Door Extractor
- High Pressure Water Jet Door Cleaner
- Jamb Cleaner
- Coke Spillage Device
- Primary and Secondary Suction Hoods
- Belt Lifting Device
- Gas Transition Unit
- Electrical PLC Control System
- Automatic Positioning System
- Hydraulic Control System including Emergency System.

LOCOMOTIVES / QUENCH CARS

DESIGNED FOR RELIABILITY

John M Henderson Locomotives incorporate the sophisticated design that makes them world leaders in reliability. They are designed for operation with either Wet or Dry Quenching or both and incorporate the following items of main equipment:

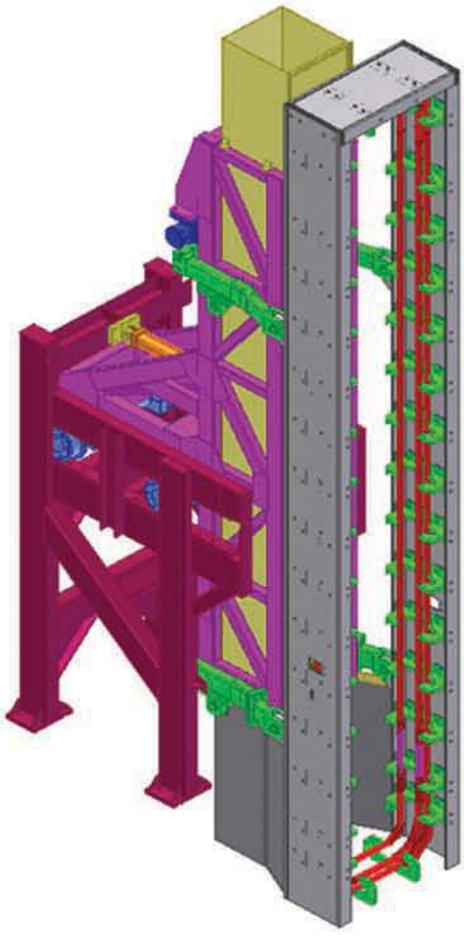
- Two driving 2 wheeled axles
- Main Chassis Structure
- Buffers and Haulage Gear
- Operator's, Electrical and Pneumatic Cabins
- Electrical Control System
- Pneumatic Control System
- Air Conditioning Equipment
- Automatic Positioning System

John M Henderson provides a selection of different types of Quench Car for both Wet and Dry Quenching. The conventional Wet Quenching Cars can be either fixed or tilting bed design machines. One-spot CSQ Cars can also be supplied. The Coke Dry Quenching Machines have one-spot design and can either be Fixed or Rotating Bucket. All Cars are specifically designed to suit the Coke Dry Quenching Process.

Some of the Key Features of the Quench Cars are:

- Robust Construction for Longevity
- Heat and Wear Resistant Lining Plates
- Pneumatic or Hydraulic Gates
- Buffer and Haulage Gear
- Reliable Heavy Duty Bogies

WATER JET DOOR CLEANER
ZERO EMISSION COKE OVEN DOORS



Zero Emission Coke Oven Doors have been one of John M Henderson's key commitments to customers all over the world.
This is why we invented the Water Jet Door Cleaner back in the '70s and it proved so successful, that we have supplied more than 100 of them to steel companies all over the world.
The advantages of the Water Jet Door Cleaner over the mechanical cleaner are numerous:

- Higher efficiency in cleaning the tar and carbon than the mechanical cleaning
- Full protection of the door seals
- Smoother door extraction / replacement
- Lower annual door maintenance costs
- Low maintenance

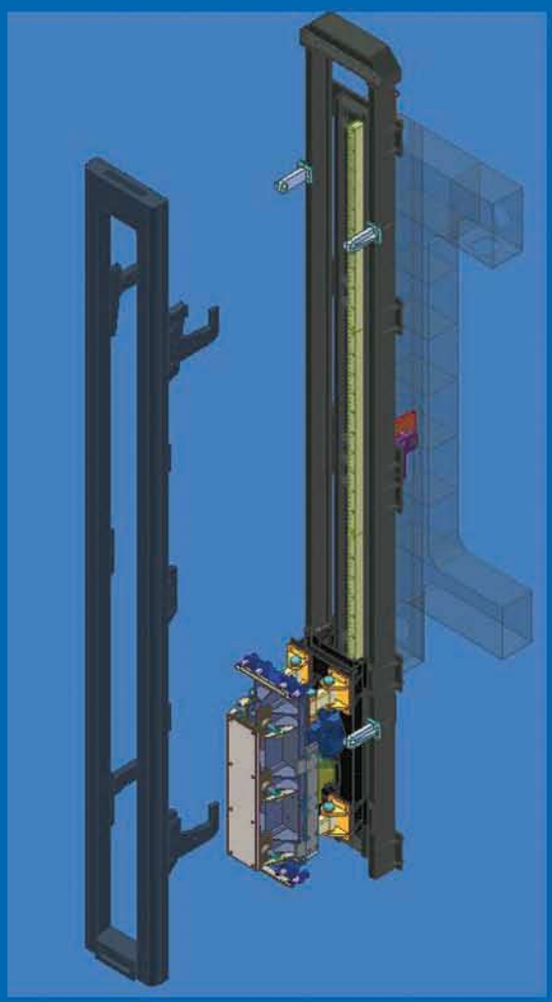
The Water Jet Door Cleaners incorporate:

- Cleaner Head
- Support Carriage
- Spray Jet Carriage
- Debris Catchment System
- High Pressure Water Pump Unit
- Electrical and Hydraulic Control System

The Cleaners are mounted on the Pusher Machine and on the Transfer Car/ Coke Side Machine. Alternatively, they can be mounted in a fixed station positioned at the end of the battery. On existing machines, the Cleaners are often installed in the support tracks already used by the original mechanical cleaner. The Electrical and Hydraulic Control of the Cleaner is normally employed from the existing PLC and Hydraulic Valve Gear, made available by the removal of the mechanical cleaner.

"INTELLIGENT" DOOR EXTRACTOR

FLEXIBLE DOOR FRAME CLEANER



Zero Emission Coke Oven Doors are achieved by complementing the cleaning performance of the JMH Water Jet Door Cleaner with the efficiency of the JMH Frame Cleaner.

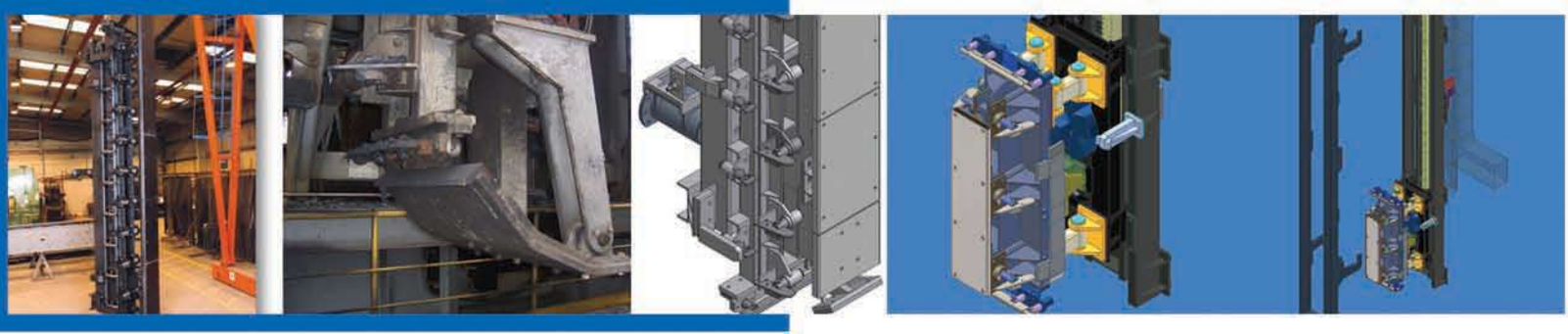
The John M Henderson Frame Cleaners are robust, but flexible enough to cope with badly aligned frames or frames with an hourglass profile.

For plants confronting serious maintenance and alignment issues, John M Henderson can provide the newly developed Frame Cleaner – an assembly that incorporates fewer blades and is easier to maintain than a standard cleaner. The new Frame Cleaner is designed to travel the full length of the frame and to perform to the highest level of frame cleaning efficiency. The innovative feature of the machine is the great flexibility in counteracting the door frame variation, thus solving one key issue in frame cleaning: the frame misalignment.

The "Intelligent" Door Extractor has been developed to address the issue of misaligned oven doors at older coke plants where the Oven Jamb Frame alignment has moved significantly from the theoretical design.

The Extractor incorporates a transducer controlled hydraulic cylinder that tilts the Extractor to a vertical attitude to suit that of the Door. This out of vertical alignment is measured and recorded by the Door Extractor.

Following door removal, the Extractor is then moved to a vertical position ready for Door Cleaning. With Cleaning complete, the transducer controlled hydraulic cylinder then positions the Door Extractor back to the out of vertical attitude in readiness for Door Replacement.



John M Henderson Machines are designed with state-of-the-art environmental protection systems, enabling them to perform to the highest standard of emission control.

This allows all customers to comply with the toughest environmental legislation.

STATE-OF-THE-ART EMISSION CONTROL SYSTEMS

CHARGING EMISSIONS

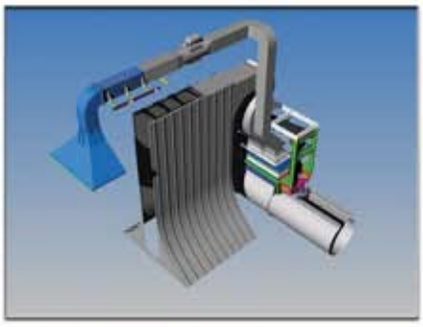
The John M Henderson Telescope System provides emission free charging with no coal spillage during the Coal Charging operation. This stainless steel assembly is installed on all new Screwfeeder Charge Cars and it has also been retrofitted on old cars around the world, with great improvements to their environmental performance.
The Telescope assembly incorporates a great deal of flexibility to operate with mis-aligned Charge Holes. The typical tolerance bands are charge hole frames 50mm offset in any direction along or across the battery and plus or minus 50mm out of alignment vertically.

OVEN DOOR EMISSIONS

Door emissions are eliminated with the use of John M Henderson proven "Jetclean" High Pressure Water Jet Door Cleaner developed 30 years ago.
The Water Jet Door Cleaners has proven to be far more efficient in cleaning the tar and carbon than the mechanical cleaning, allowing for a smoother door extraction / replacement and a reliable and lower annual door maintenance.
John M Henderson has supplied more than 100 cleaners to a significant number of countries in each continent.

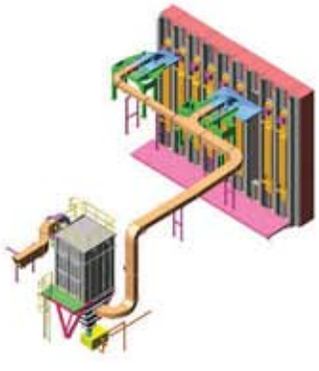
COKE SIDE EMISSIONS

John M Henderson Transfer Cars are designed to satisfy the toughest environmental regulations and incorporate state-of-the-art design innovations, which make them world leaders in emission control. They are used in conjunction with a Fixed Collecting Duct and Land Based Filter Plant.
The John M Henderson Hood System collects emissions as the coke is pushed into the Quench Car. A system of ducting then leads the collected dust and gases to a gas transition unit incorporating a belt lifter, which transfers the gases to the central bag filter plant for treatment.



PUSHER SIDE EMISSIONS

The John M Henderson Pusher Machines incorporate state-of-the-art Emission Control Systems that eliminate the Pusher Side Emissions during door removal, pushing and levelling functions. This system uses a Reverse Jet Bag Filter Unit to remove the dust from the high temperature gases generated during the pushing and levelling sequences.

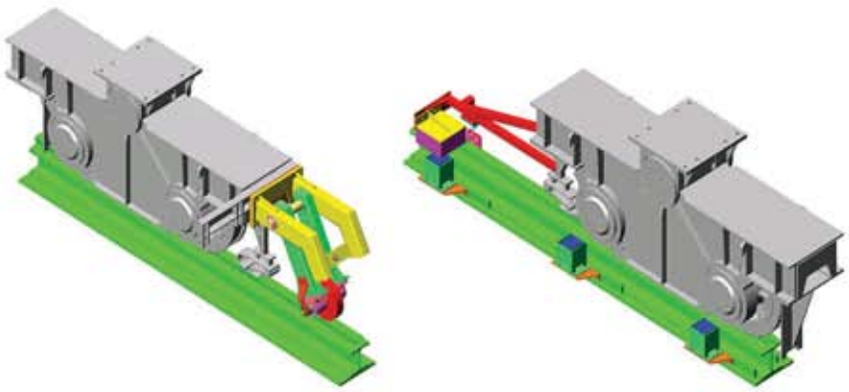


FULLY AUTOMATED "MANLESS" OPERATION

John M Henderson Coke Oven Machines are designed for Fully Automatic "Manless" Operation. This involves the incorporation of all necessary mechanical, control and communication equipment on the machine to enable the remote control with no operator on board. All Machines incorporate an Electronic Operator Terminal or Human Machine Interface (HMI), but have the facility to be operated from a control room overlooking the battery.

Automatic Alignment and Identification System

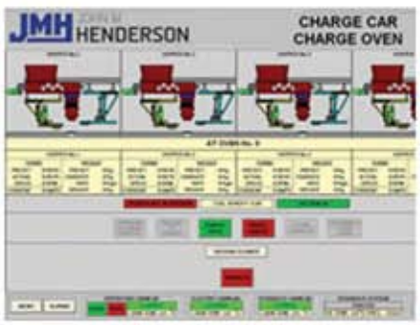
The Automatic Alignment System measures the position of the machine and automatically aligns it at the required oven location. An oven identification system is also incorporated to ensure that the machine has aligned at the correct oven.

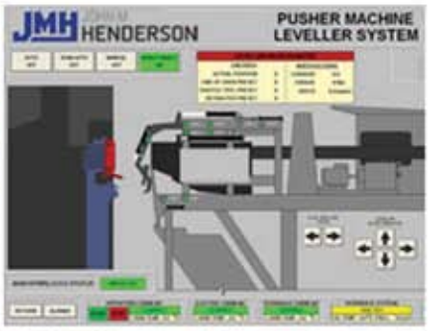


Coordination PLC and Supervisory System

John M Henderson Machines are equipped with a PLC control system with inverter control of all drive motors. Combined with an Automatic Alignment system it provides smooth and accurate control over the machine's movement and final positioning.

To provide Fully Automatic "Manless" Operation, a Coordination PLC and Supervisory System is installed in the battery control room. This system operates as an interface between the machines themselves and between the machines and the control system.





Customised Automation Solutions

Each automation solution is specifically designed to suit the customer's individual requirements. This involves a specific selection of components and a required level of machine control.

The available options include: Manless operation, Fully Automatic or Semi-Automatic Sequence control.

All machines incorporate an Electronic Operator Terminal or Human Machine Interface (HMI) giving local Automatic, Manual and Maintenance modes of operation.

Communication Reliability via Fibre Optic

John M Henderson Pusher Machines and Transfer Cars can be equipped with a combined Power and Fibre Optic Cable Reel, removing the potential difficulties experienced with Power Conductor Bars or Trolley Wires and ensuring excellent reliability of communications via the Fibre Optic cores.

Alternatively wireless communication can be provided using the latest high performance Ethernet radio equipment.

BUILDING STRONG PARTNERSHIPS

Pusher Machine, Lucchini, Italy

Charge Car, Dofasco, Canada

Locomotive, Posco, Korea

Waterjet Door Cleaner, CST, Brazil

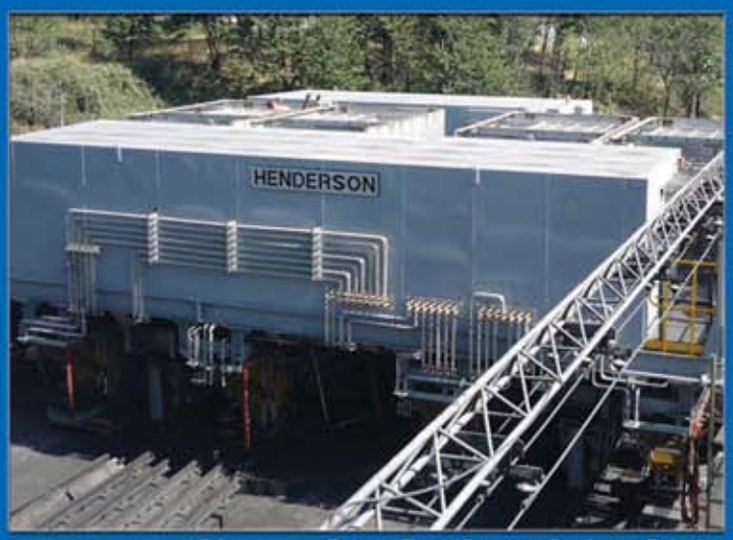
Transfer Car, Posco, Korea

Transfer Car, US Steel, Canada

200+ MACHINES INSTALLED WORLDWIDE

Pusher Machine, Posco, Korea

Transfer Car, Lucchini, Italy



Charge Car, Italiana Coke, Italy

Quench Car, Posco, Korea

Cokeside Machine, Tata Steel, UK

Transfer Car & Locomotive, Posco, Korea

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