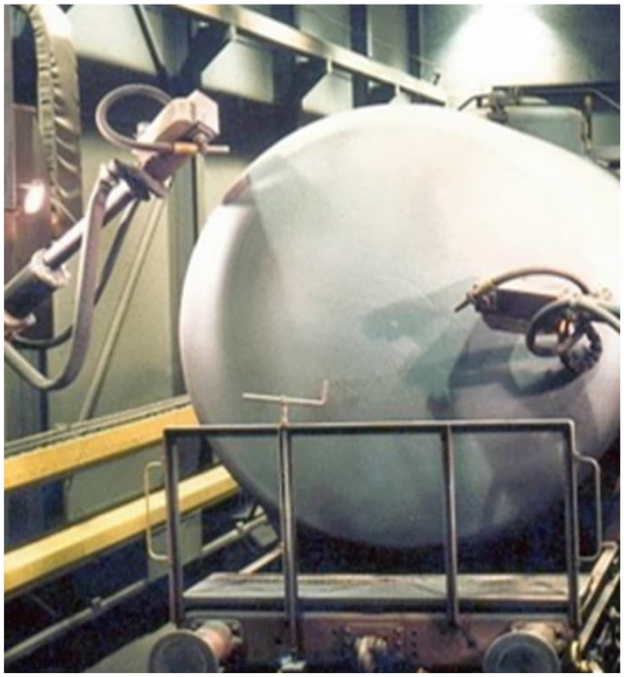
Blastman Robotics Ltd

# FREIGHT CARS

# Built for Blasting

www.blastman.com

# CUSTOMER EXPERIENCES



*”Through our years of using Blastman robots, we have been able to maintain our existing workforce and keep our workers happy. Currently we’re facing a situation where blast cleaners are retiring due to their age, instead of leaving for health issues. This is a first in our history. Blastman robots have also allowed us to keep our production efficient and our quality at the highest level.”*

**Juhani Uimonen, VR, Finland**

*”We’ve been using Blastman Robotics at our facility for over 20 years. Our original robots held up to near constant use for over 15 years in the extremely harsh blasting environment and most recently we have upgraded to the newer servo models. These robots have allowed us to continue our high production rates as well as maintaining quality and efficiency in our blasting process. Their support staff have been extremely helpful in troubleshooting any issues, allowing us to keep production downtime to a minimum. We would recommend Blastman robotics for anyone’s blasting needs. ”*

**Matt Leahy, National Steel Car, USA**

# FREIGHT CARS

Blastman robots have been used in the production and maintenance of freight cars since 1990. From the beginning, robots have been proven to be the most efficient method of blast cleaning entire freight cars with minimum manual blasting.

Already each year more than 50 000 freight cars get blasted by Blastman robots. Painting quality of freight cars is very critical because the cars are directly exposed by transport and weather conditions. The exterior paint job gets hit by dust, and sand constantly, damaging the paint and possibly peeling poorly adhered sections. Especially in long-distance haul, the freight car weather conditions can vary from tropical to arctic weather, which causes special requirements in paint adhesion.

The freight car production and maintenance are a perfect process to be robotized due to repeating workpieces with a large surface area to be blasted according to high surface quality standards. Additionally, the interior coating quality is crucial as well since it is often measured and needs to be by national or international standards. The interior coating also wears over time as contents of the freight car are loaded and unloaded. Often, transported materials are corrosive themselves, putting an extra strain on the interior coating.

The Blastman robot is optimal for the production of new freight cars and repair work. The Blastman automatic robot can blast clean the interior and exterior surfaces of train cars, whilst providing a constant surface quality for every part of the surface. The constant and high-quality surface treatment is essential, since 80 % of all paint, and other coating, failures are caused by poor surface pre-treatment. High-quality surface treatment prior to coating ensures excellent adhesion between the coating and metal surface.

A mechanically strong paint film also prolongs the lifetime of a freight car. Often manufacturers are required to give a warranty for the exterior paint job and interior coating. To ensure the coating lasts for a long time, proper surface treatment before painting is required. Blast cleaning itself is a very demanding job for anyone. Manual blasters change their job quite easily and the availability of labor is low. This is creating issues for manufacturers throughout the industry. Switching to an automated robotic process greatly improves workplace safety and worker motivation. This ensures that workers remain in the company for a longer time, which reduces the need for new requirements. Also, the know-how of blast cleaning stays in the company.

Blastman Robotics Ltd

CASE STUDY

# TIKHVIN FREIGHT CAR BUILDING PLANT

Tikhvin, Russia

## BACKGROUND

Due to high production rate Tikhvin Freight Car Building Plant decided to invest in robotized and manual blast chambers for freight car blast cleaning.
After production started in 2012 they soon discovered benefits of automated blast cleaning and manual chamber was also equipped with Blastman robots in 2013.
Originally manual chamber was designed to be suitable for robotics blast cleaning as well.

**Tikhvin Freight Car Building Plant** is considered to be one of the most large-scale objects in the European machine building industry on the amount of investment, production facilities and high-technology capacity.

## OBJECTIVES

The requirement was to blast clean completely exterior and interior surfaces of various freight cars with given speed.
Factory target production is 13 000 freight cars annually.

Blastman Robotics Ltd

CASE STUDY

# TIKHVIN FREIGHT CAR BUILDING PLANT

Tikhvin, Russia

## SOLUTION

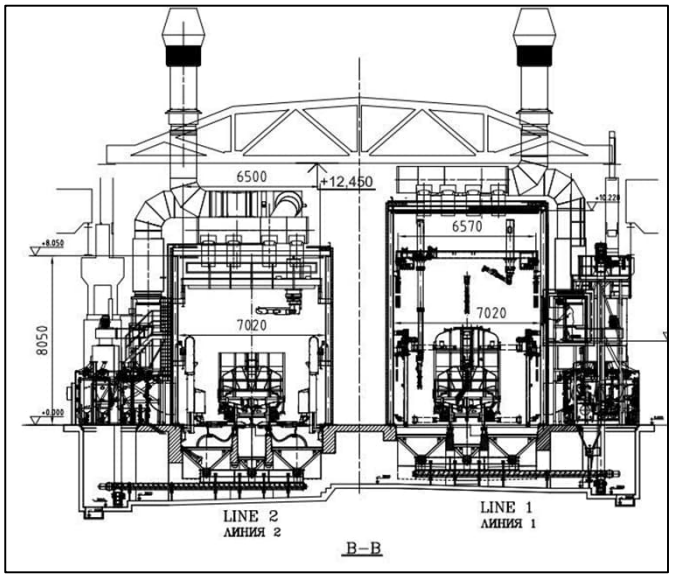
Surface treatment facility consists of two parallel production lines.
Each robot blast room is equipped with two units of Blastman B20 robots and two units of Blastman B16 robots. Each robot arm manipulates two parallel blast nozzles with 16 mm diameter.
The Blastman robots clean both interior and exterior surfaces of various freight cars. Removing of abrasive and occasional manual blasting is done in following cleaning chamber.
Blasting time for freight car is 25-45 minutes, depending on freight car type.

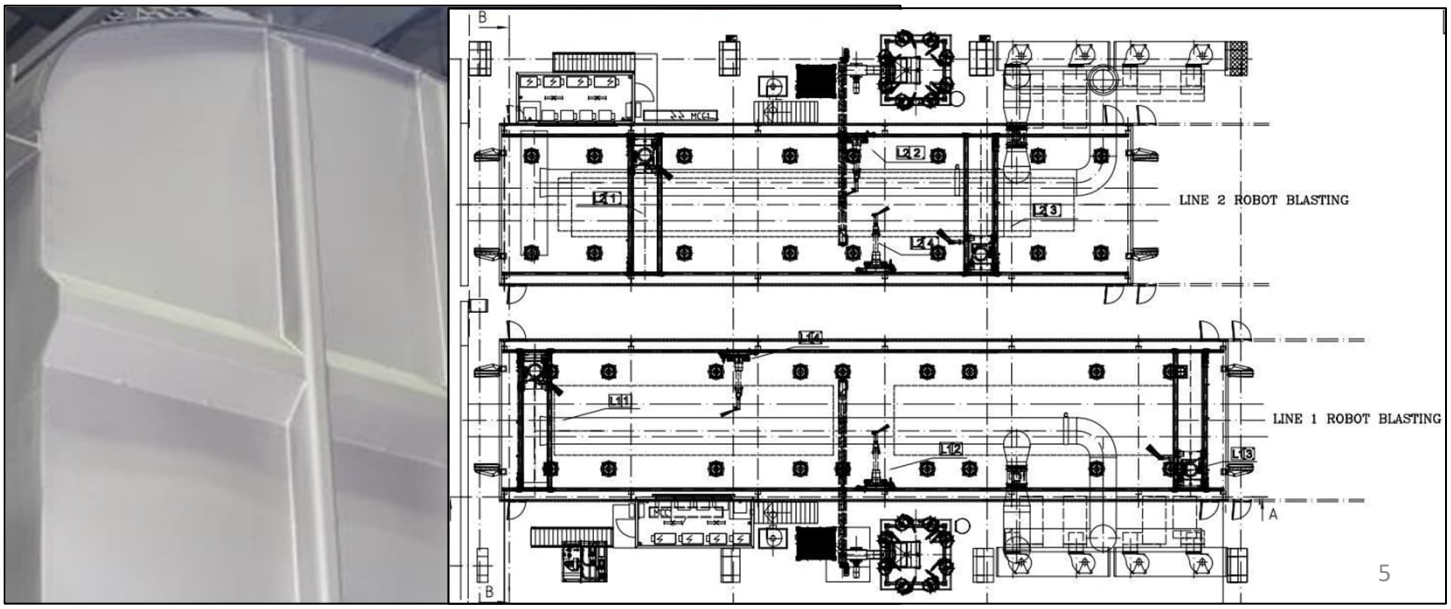
## RESULTS

The production capacity rate was reached after optimizing the line operation during production ramp up period. The amount of manual touch up is minimized.
Due to optimized operation of the robots and carefully selected abrasive material (steel grit) the required surface roughness and cleanliness Sa 2 ½ have been achieved.

## TECHNICAL INFORMATION

| | |
|---|---|
| Amount of robots | 4 robots per chamber |
| Nozzle diameter | 16 mm |
| Number of nozzles/robot | 2 |
| Blasting pressure | 8 bar |
| Blasting rate | 100-160 m2/h |
| Abrasive | Steel grit |
| Degrees of freedom | 8 |
| Programming | Offline and Point-to-Point |
| Operation mode | Automatic |



# GATX

Hearne, Texas, USA

## DELIVERY IN 2020

Blastman B20S7

2 x BP1400

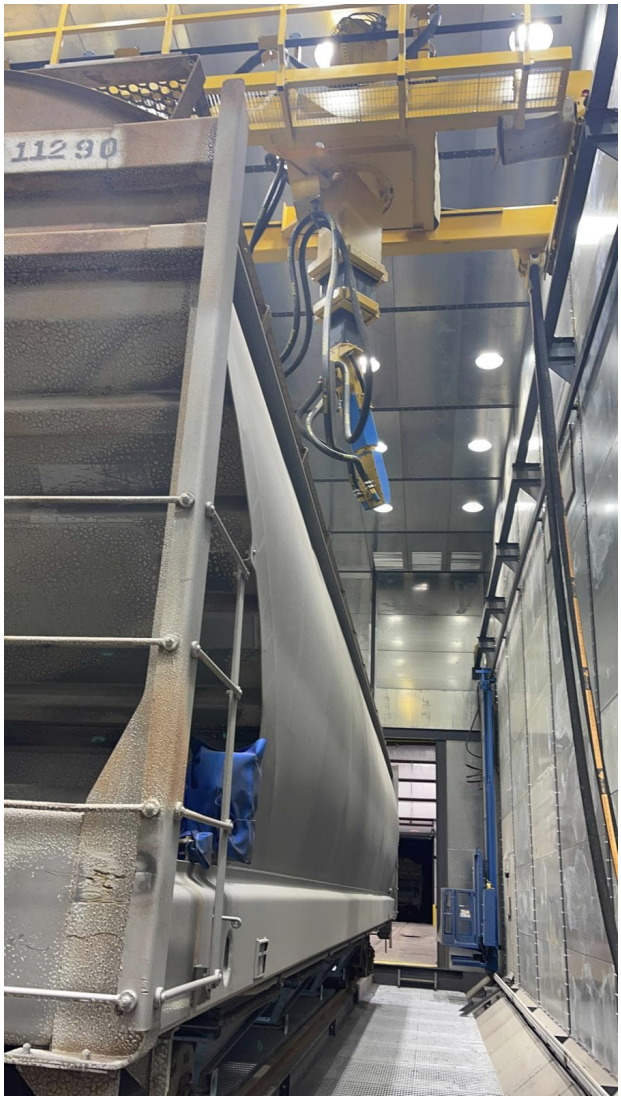
Blastman Studio

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators




## PROCESS INFORMATION

**Workpiece**

-Blast cleaning hopper cars

**Workpiece condition**

- Existing coating

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 16 mm

**Efficiency**

- 75min per hopper interior

**Typical manual blasting efficiency**

- 5-10 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5 / SP 10

# UTLX

Cleveland, Ohio, USA

## DELIVERY IN 2020

Blastman B20CX

Blastman BP1400

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators


## PROCESS INFORMATION

**Workpiece**

-Blast cleaning hopper cars

**Workpiece condition**

- Existing coating

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 40 – 70 $m^2$/h

**Typical manual blasting efficiency**

- 5-10 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5 / SP 10

# FREIGHT CAR AMERICA

Cherokee, Alabama, USA

## DELIVERY IN 2019

2 x Blastman B20S7

Blastman B20S robot

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

-Blast cleaning freight cars

**Workpiece condition**

- Rust grade D with existing coating

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2+2 x 19 mm

**Efficiency**

- 75min per hopper interior

**Typical manual blasting efficiency**

- 5-10 $m^2$/h for a similar process

**Cleanliness**

- SP 10

# UNION TANK CAR (UTLX)

Texarkana, USA

## DELIVERY IN 2018 and 2020

Blastman B20CX robot

Blastman B20S7 robot

2 x BP1400 blast pot

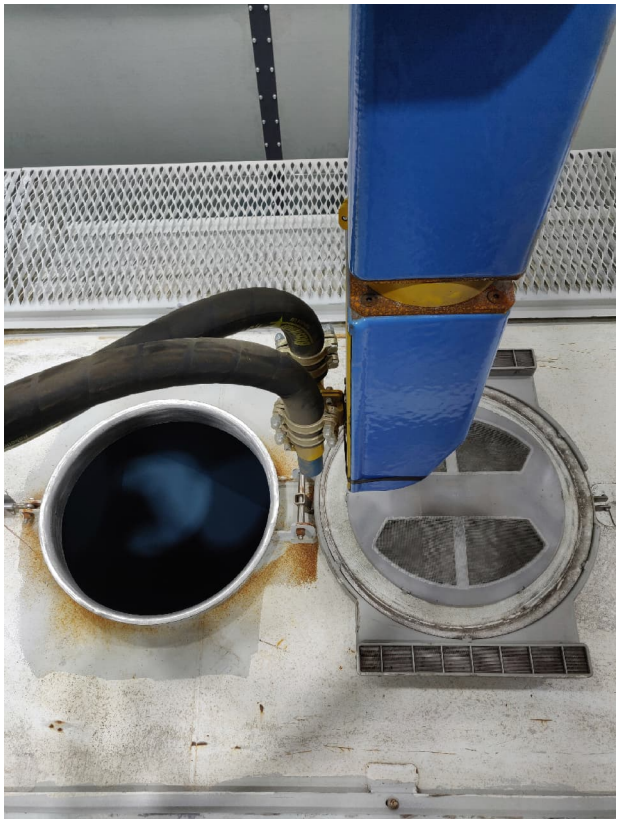
Machine vision system

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators



## PROCESS INFORMATION

**Workpiece**

- Hopper car interiors and exteriors

**Workpiece condition**

- Rust grade D with existing coating

**Pressure**

- 8 - 10 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 40 -70 $m^2$/h for exterior
- 75 min per hopper interior

**Typical manual blasting efficiency**

- 5-10 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

# UNION PACIFIC

De Soto, Missouri, USA

## DELIVERY IN 2017

2 Blastman B16 robots

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Autorack railcars

**Workpiece condition**

- New production, rust grade A-B

**Pressure**

- 8 bar

**Abrasive**

- Garnet

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 50 – 200 $m^2$/h

**Typical manual blasting efficiency**

- 5-10 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

# JSC BELARUSKALI

Soligorsk, Belarus

## DELIVERY IN 2016

Blastman B20CS robot

BP350 blast pot

Blast chamber

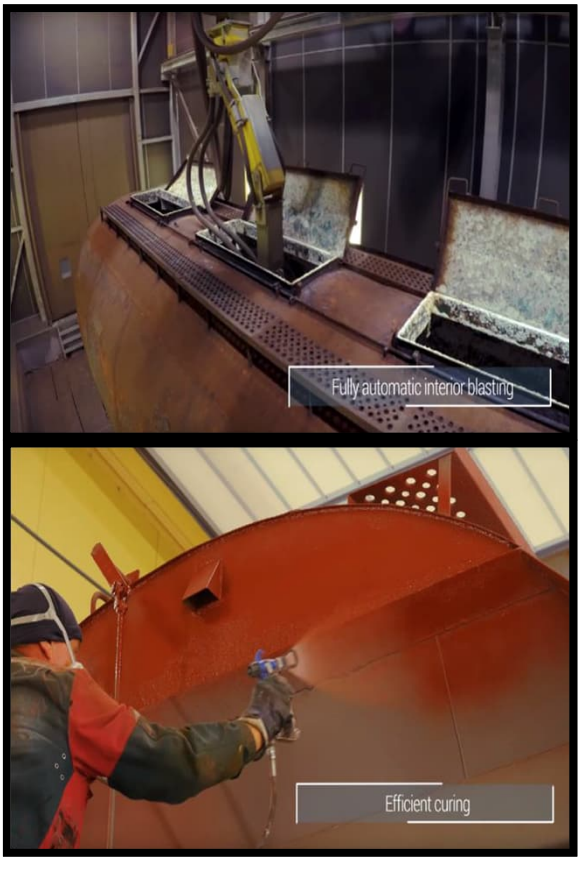
Drying and preparation chamber

2 paint chambers with manlifts

Marking chamber with manlifts

Compressor station

Rail car transfer system




## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Hopper cars

**Workpiece condition**

- Rust grade D with existing coating

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 16 mm

**Efficiency**

- Minimum 3 cars per 16 hours day
  75 $m^2$/h

**Typical manual blasting efficiency**

- 5-10 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

# RANDON S/A IMPLEMENTOS E PARTICIPAÇÕES

Araraquara, Brazil

## DELIVERY IN 2015

2 Blastman B20S robots

Abrasive reclaim

Handling system

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Freight cars and road transport vehicles

**Workpiece condition**

- New production, rust grade A-B

**Pressure**

- 5,5 – 9 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 300 – 500 $m^2$/h

**Typical manual blasting efficiency**

- 10-15 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

# NATIONAL STEEL CAR

Hamilton, Canada

## 1 st DELIVERY IN 1997

2 Blastman B20 and 2 B16 robots

## 2 nd DELIVERY IN 2004

2 Blastman B20 and 2 B16 robots

Blast vessels

Offline programming with a simlation application

## 3 rd DELIVERY IN 2014

2 Blastman B20 robots

## 4 th DELIVERY IN 2016

2 Blastman B16S robots

## 5 th DELIVERY IN 2019

2 Blastman B20S robots

2 Blastman B16XS robots

*"We've been using Blastman Robotics at our facility for over 20 years. Our original robots held up to near constant use for over 15 years in the extremely harsh blasting environment and most recently we have upgraded to the newer servo models. These robots have allowed us to continue our high production rates as well as maintaining quality and efficiency in our blasting process. Their support staff have been extremely helpful in troubleshooting any issues, allowing us to keep production downtime to a minimum. We would recommend Blastman robotics for anyone's blasting needs."*

**Matt Leahy, National Steel Car ,Canada**

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Various types of freight cars

**Workpiece condition**

- New production, rust grade A-B

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 150 – 300 $m^2/h$

**Typical manual blasting efficiency**

- 5 -10$m^2/h$ for a similar process

**Cleanliness**

- Sa 2,5

# FINNISH STATE RAILWAYS (VR)

Pieksämäki, Finland

## DELIVERY IN 1990

2 Blastman BR20 robots

## MODERNIZATION IN 2007

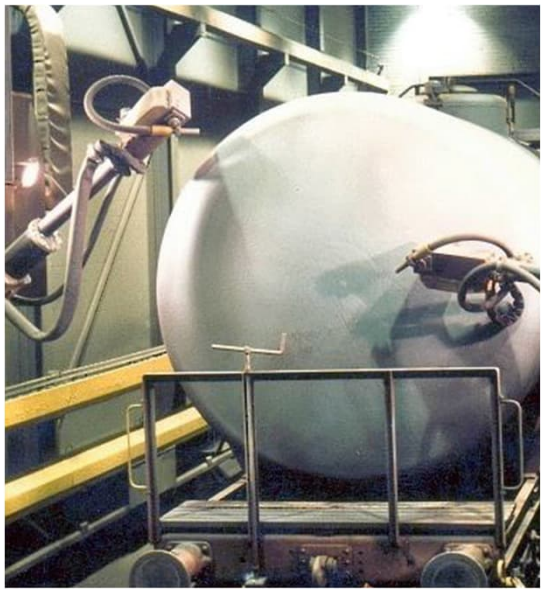
Overall rebuild of control system and mechanical devices

## MODERNIZATION IN 2014

Control system

Electrification

Replacing hydraulic technology to latest servo technology



*"Through our years of using Blastman robots, we have been able to maintain our existing workforce and keep our workers happy. Currently we're facing a situation where blast cleaners are retiring due to their age, instead of leaving for health issues. This is a first in our history. Blastman robots have also allowed us to keep our production efficient and our quality at the highest level."*

**Juhani Uimonen, VR, Finland**

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Various types of railway wagons

**Workpiece condition**

-Rust grade D with existing coating

**Pressure**

- 7 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 1 x 16 mm

**Efficiency**

- 50 – 100 $m^2$/h

**Typical manual blasting efficiency**

- 5 -10$m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

# TIKHVIN FREIGHT CAR BUILDING PLANT

Tikhvin, Russia

## 1st DELIVERY IN 2010

2 Blastman B20 and 2 B16 robots

2 Blastman B16ML manlifts

Blast chamber

Modification for robot blasting and blast vessels

## 2nd DELIVERY IN 2013

2 B20S and 2 B16S robots

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Various types of freight cars

**Workpiece condition**

- New production, rust grade A-B

**Pressure**

- 9 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 400 $m^2$/h

**Typical manual blasting efficiency**

- 10-15 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

# NATIONAL ALABAMA CORPORATION

Alabama, USA

## DELIVERY IN 2008-2009

4 Blastman B16 robots

4 Blastman B16 LR robots

Robots were delivered for two separate production lines

Line control and safety logic for both lines

Offline programming tool for both lines


## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Various types of freight wagons

**Workpiece condition**

- New production, rust grade A-B

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 1 train car fully treated per shift, 150 – 300 $m^2/h$

**Typical manual blasting efficiency**

- 10-15 $m^2/h$ for a similar process

**Cleanliness**

- Sa 2,5

# URALVAGONZAVOD

Nizhni Tagil, Russia

## DELIVERY IN 2008-2009

2 complete surface treatment lines

4 Blastman B20 robots

4 Blastman B16 robots

8 Blastman B16ML manlifts

2 automated blasting chambers, and
2 manual blasting chambers

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Various types of freight wagons

**Workpiece condition**

- New production, rust grade A-B

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 300 – 600 $m^2$/h

**Typical manual blasting efficiency**

- 10-15 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

# FINNISH STATE RAILWAYS

Hyvinkää, Finland

## DELIVERY IN 2003

Blastman B20C robot

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Various types of railway wagons

**Workpiece condition**

- Rust grade D with existing coating

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 1 x 19 mm

**Efficiency**

- 50 – 200 $m^2$/h

**Typical manual blasting efficiency**

- 5-10 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

# MINISTRY OF RAILWAYS

Vitebski, Belarus

## DELIVERY IN 2002

Blastman B20C robot

Complete blast chamber

Pre-drying chamber and apinting chambers

Railcar transfer system

Compressor station

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operator

## PROCESS INFORMATION

**Workpiece**

- Tank cars

**Workpiece condition**

-Rust grade D with existing coating

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 50 – 200 $m^2/h$

**Typical manual blasting efficiency**

- 10-15 $m^2/h$ for a similar process

**Cleanliness**

- Sa 2,5

# SNCF

Paris, Romilly, Rouen, Lille, France

## DELIVERY IN 1995-2000

4 Blastman BWS for different SNCF workshops

Complete blast chamber

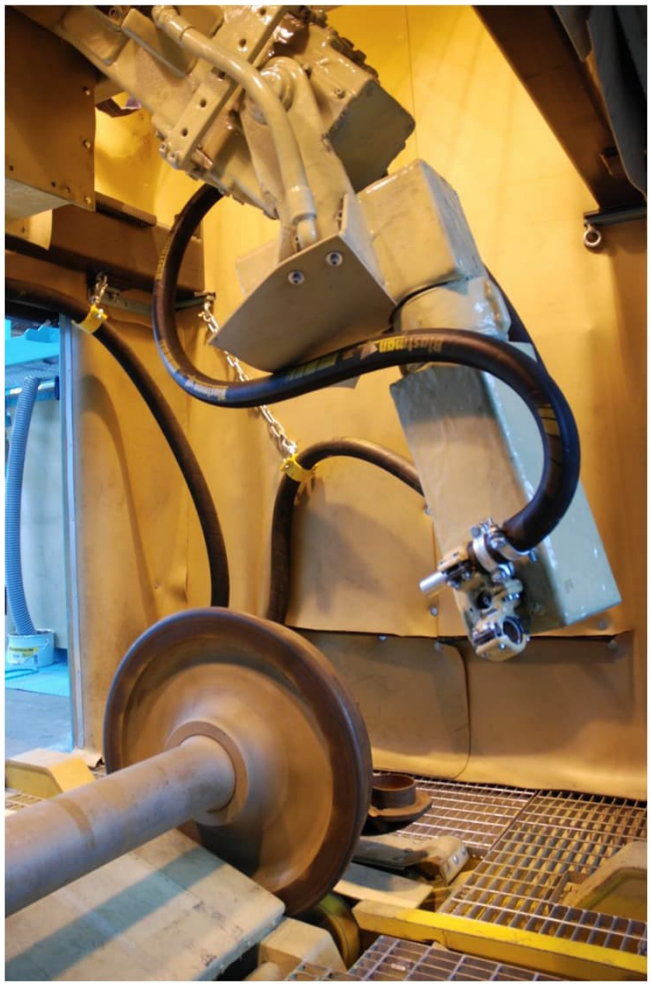
Complete abrasive handling and ventilation

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators



## PROCESS INFORMATION

**Workpiece**

- Wheel sets

**Workpiece condition**

- New production, rust grade A-B

**Pressure**

- Up to 12 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

-1-2 x 6 - 19mm

**Efficiency**

- 30 -100 $m^2$/h

**Typical manual blasting efficiency**

- 5-10 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

# SFAT

Rjazan, Russia

## DELIVERY IN 1993

Blastman B20C robot

## OBJECTIVE

Automate production

Improve quality and efficiency

Improve health and safety of operators

## PROCESS INFORMATION

**Workpiece**

- Tank cars

**Workpiece condition**

-Rust grade D with existing coating

**Pressure**

- 8 bar

**Abrasive**

- Steel grit

**Nozzle / robot**

- 2 x 19 mm

**Efficiency**

- 50 – 200 $m^2$/h

**Typical manual blasting efficiency**

- 5-10 $m^2$/h for a similar process

**Cleanliness**

- Sa 2,5

Blastman Robotics Ltd

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