ZAŁĄCZNIK NR 5 SPECYFIKACJA TECHNICZNA

Postępowania nr EU/34/MHC/ZZ/2025 o udzielenie zamówienia w trybie przetargu nieograniczonego na dostawę **2 sztuk Mobilnych Żurawi Portowych**

dla projektu pt:

„Wyposażenie terminalu intermodalnego BCT w nowoczesne urządzenia przeładunkowe”

w ramach inwestycji E2.1.3 „Projekty intermodalne” Krajowego Planu Odbudowy i Zwiększania Odporności
Projekt nr KPOD.09.09-IW.02-0033/24

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Baltic Container Terminal Ltd.

Technical Specification for the Supply of Two (2) Mobile Harbour Cranes and Three (3) Single-lift Spreaders

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Poland

Contents

1 Project

Supply of the following equipment defined within the Technical Specification:

Two (2) Mobile Harbour Cranes (MHC)

Three (3) Mobile Harbor Crane Single-lift Spreaders 41 MT

The MHC will be required to operate only within the confines of the Purchaser's port boundaries.

2 GENERAL DESCRIPTION

A. The MHC shall be designed as a container-handling unit for heavy-duty terminal applications.
B. Mobile Harbour Cranes suitable for handling :
   - General and project cargo with hook
   - Containers with spreader
C. The design of the MHC shall recognize that the machine will be subjected to an arduous duty cycle. Particular attention shall be given to maintainability.
D. The MHC will be operating with utilization of up to 90%, 7 days per week operation interrupted only as required for Contractors recommended maintenance.

3 GENERAL TECHNICAL SPECIFICATION

3.1 MATERIALS

A. Materials used in the MHC shall be new and of the best quality, suitable for the duty.
B. Materials shall be free from flaws. All castings shall be smooth, sharp and free from blowholes, with ample fillets, and correctly centralized cores. All structural sections and plate shall be free from scale.
C. No plates, flat bars or angles used in load bearing structural members, including platform supports, shall be less than 6mm thick.
D. Components from renowned, experienced global manufacturers should be used

3.2 WORKMANSHIP

A. Workmanship shall be of the highest standard
   All plates, sections, etc. shall be straightened or curved as may be required by pressure and not by hammering.
B. Burrs on all material shall be removed before painting. Screw threads shall be accurately produced in accordance with designer's specification and classification.

3.3 QUALITY CONTROL AND INSPECTION

A. The manufacturer shall submit evidence that a formal system of quality control is applied to all purchased materials and equipment.
B. Reasonable access shall be provided by the manufacturer to the Purchaser's inspecting authority which may be requested to attend the manufacturer's works, or works of the manufacturer's sub-contractors, during construction.
C. Load tests shall be carried out prior to shipment. Notwithstanding this the unit will again be checked and will undergo a full operational inspection including proof load test on arrival at the Purchaser's site.
D. The following definitions determine the extent to which substitutions may be produced.

"OR APPROVED EQUAL" material, products, or service require approval by addendum prior to the proposal due date. Materials, products or services which the Vendor proposes to substitute, and which he/she considers equal to those specified, must be submitted to the Purchaser, Baltic Container Terminal (BCT), Head of Engineering, not later than 10 days prior to the proposal submittal due date. Requests

shall be accompanied by complete technical data and such pertinent information and/or samples as necessary, or as specifically specified, to fully identify and apprise the material, product, or service. Approval of materials, products, or services deemed equivalent will be issued by addendum prior to the proposal submittal due date.

"OR EQUAL" materials, products, or services do not require approval prior to the proposal submittal due date. Materials, products, or services which the Vendor proposes to substitute and which he/she considers equal to those specified shall be submitted to BCT, Head of Engineering for approval. The proposed substitution shall anticipate necessary lead-time required for approval by the Terminal and procurement by the vendor. Such submittal shall be accompanied by complete technical data and such pertinent information as necessary to fully identify and appraise the material, product, or service. No increase in the contract price or time will be considered when substitution is not approved.

4 GENERAL DIMENSION

4.1 LOAD CAPACITY

The MHC shall be designed to

Maximum lifting capacity under the hook - 124 - 125 MT
Maximum lifting capacity under spreader - 60 MT
Maximum lifting capacity at 21m outreach hook - 124 - 125 MT

4.2 DIMENSIONS

Parameter	Value
Outreach	
Maximum	48-51m
Minimum	11m (or less)
Hoist Height	
(Measured from quay to crane rope socket)	
At minimum outreach	45-48m (or more)
At 48-51m outreach	27-36m (or more)
Below Quay	15m (or more)
Turning Radius	To be defined by contractor according to his machine design.
Crane Operator viewing height (eye level to ground)	24-29m approx.
Traveling	
Inclination, transverse direction, no load	2% (at least)
Inclination, longitudinal direction, no load	5% (at least)

4.3 MAX LOAD ON QUAY SURFACE.

Uniformly distributed load – 4.0 t/m²

Maximum load on tire – 16 t/tire

4.4 SPEED OF OPERATION

Maximum travel speed 0-80 m/min

Hoisting / lowering speed 0-120 m/min

Tonnage (ton)	Minimum Speed (m/min)
<=5	120
5-10	95
47	50
63	35
100	22
125	20

Slewing 0-1,6 rpm

Tonnage (ton)	Minimum Speed (rpm/min)
<=74	1.6
100	0.5
125	0.3

Luffing speed 0- 65 m/min

Tonnage (ton)	Minimum Speed (m/min)
<=74	80
100	25
125	10

5 SITE CONDITIONS

Baltic Container Terminal (BCT)	Kwiatkowskiego Str. 60, 81-127 Gdynia
Environment	Seasonal climate in a Polish port which handles containerised cargo, project cargo (heavy-lift) and bulk materials such as coal, gypsum, phosphate, fertilizer, cement and grain. Prolonged freezing temperatures snow, rain and storm conditions with lightning strikes.
Ambient Temperatures	Absolute Minimum minus 25° C Absolute Maximum plus 45° C
Humidity (relative)	Minimum 60.0 % Maximum 95%
In Service Wind Speed (Sustained)	22m/s
In Service Wind Speed (Gust)	25m/s
Maximum Recorded (sustained)	42m/s

6 COMPLIANCE REQUIREMENTS

The MHC shall comply with the requirements of the European Machine Guidelines, particularly Machinery Directive 2006/42/EC, Technical Specifications, appropriate National and Local Standards, Statutory Orders, Regulations, Acts and Codes that apply. The MHC have to be provided with a declaration of conformity and the CE marking and symbol according to the relevant annexes of the Machinery Directive.

A certificate of conformity CE shall be supplied with the MHC on delivery.

7 STRUCTURE

A. The MHC shall be constructed from standard hot-rolled steel sections. The steel grades shall be of weldable quality not requiring special temperature conditions for repair works.

   Sections and steel plate covers which shell be more resistance to damage shall be provided to give full all-round mechanical protection to the chassis members and to the side fittings such as, fuel tanks, batteries and hydraulic tanks those element should be fabricated from heavy duty hot-rolled steel.

   Where steel plate covers are used to protect components, which require regular inspection, maintenance or replenishment then a means of easy access shall be provided. Particular care shall be given to the selection of hinges, which may be subjected to wear or corrosion because of the prevailing conditions.

B. The structure shall be so designed that water pockets are not formed in any member or by the inter-section of members and be such that there shall be no unsealed blind areas where paint cannot be applied. Adequate drainage holes shall be provided to discharge water clear of the structure in all cases where there is a tendency for water to collect.

C. Access, platforms, stairways and handrails shall comply with European Machinery Directives and European Standard EN 13586:2009-05.

D. All horizontal steel cover plates, which may be used for access, shall be treated with a proven, durable anti-slip surface.

E. Built-in recesses and/or steps shall be provided for access to and from ground level and where required corrosion resistant 'hand-holds' shall be fitted.

F. Where sections of the engine exhaust system are adjacent to an access route or where they may be used as handholds then substantial temperature shielding shall be provided.

8 GROUP CLASSIFICATION OF CRANE COMPONENTS

Heavy load operation SWL>100 t	A3
Standard load operation SWL < 100t	A6
Spreader operation SWL<60t	A8

Classification of individual mechanism as whole

	Normal load	Heavy load	Spreader
Hoisting gear	M8	M4	M8
Luffing gear	M7	M7	M7
Slewing gear	M7	M7	M7
Travelling gear	M4	M4	M4

9 MECHANICAL TECHNICAL SPECIFICATION

9.1 MECHANICAL DESIGN

This section covers the provision by the Contractor for all labour and materials supplied:

A. to design, manufacture, ship and install the necessary mechanical materials, equipment and appurtenances.

B. to shop test as far as practicable and to field-test the entire mechanical equipment of the MHC.

9.2 GENERAL

A. Responsibility for the reliable operation of the equipment in accordance with the requirements of this Specification shall be borne entirely by the Contractor. The Contractor shall demonstrate with his drawings and specifications and with the required tests that the equipment is capable of performing all of the required functions with minimum of downtime.

B. The mechanical equipment shall be designed to be fully capable of operating the MHC reliably at the specified requirements on a continuous duty cycle, safely with minimum noise, vibration and maintenance in accordance with local EU regulations.

C. All parts of the mechanical equipment shall be designed so that they may be easily assembled, adjusted, removed for replacement and easily accessible for lubrication, inspection, maintenance, and repair. Emphasis shall be placed upon quick replacement of faulty or worn parts as opposed to repair in place. Where necessary for access, permanent platforms, walkways, handrails, stairways and ladders shall be provided.

D. The design shall be system safe as far as practical so that the failure of a component or loss of power precludes accidental lowering or coasting out of control.

E. Parts, components, and purchased sub-systems shall be readily accessible in the country of operation.

F. All materials shall be identified by reference to the specification of an internationally recognized standard association with indication of equivalence to a local standard where applicable.

10 Electrical

Power Supplies provided for sub systems shall comply with the following standards:

i) Shore Supply Voltage (for Auxiliary Systems – AC 400V ±10% 60/50 Hz ±5%, 3-phase

ii) Main drive DC Motors (where fitted) – voltage to be proposed by the Supplier.

iii) Control Voltage for all systems – 110/120/230 V 1-phase 60/50Hz

iv) AC Motors – AC 440 V 3-phase 60 Hz

v) Lighting, Single-Phase Circuits – AC 230 V 1-phase 60/50 Hz
Lighting, Three Phase Circuits – AC 440 V 3-phase 60/50 Hz

vi) Alarm, intercom, and other accessories – AC 230 V 1-phase 60/50 Hz

vii) Receptacle Outlets – AC 230V 1 Phase 60/50Hz

viii) Air-conditioning systems – AC 440 V 3-phase 60/50Hz

ix) MHC monitoring - On-board and remote

11 DRIVE SYSTEM

11.1 Main Drive

A. The MHC shall be powered by a diesel/electric, diesel/hydraulic appropriately rated to provide continuous operation according to the specification hereby defined.
B. The engine shall be in accordance with applicable in force emission standards and in full compliance with all latest Site, Region and/or Country environmental regulations applicable today and in near future. (EURO STAGE V)
C. Engine will have a block heater (230V)
D. Exhaust shall be heavy-duty upswept type manufactured from stainless steel.
E. The engine shall be fitted with automatic shutdown “safety circuits” in event of loss of oil pressure, low coolant level or high-water temperature. The system shall be “circuit safe” whereby interruption of an electrical signal will identify an unhealthy condition and shut down the engine. Indicators shall identify the reason for shut down and remain illuminated after the engine has stopped. A reset push button, out of the operator’s cabin, will permit the engine to be restarted for troubleshooting purposes.

11.2 Secondary Drive

Secondary Power Source shall be and Energy Saving Device such as Batteries, Ultracapacitors, Hydraulic accumulators.

11.3 FUEL TANK

A fuel tank shall be provided giving good access for refilling and maintenance yet suitably protected against impact damage. A strainer shall be incorporated into the filler neck and an inspection plate which will permit access for cleaning inside the entire tank. The capacity of the tank shall be minimum 6000 liters. An easily accessible water trap shall be provided in the fuel line designed to collect all impurities before the fuel reaches the injectors. The diameter of the fuel filler should be 70 mm.

Additional fuel level indicator installed at chassis.

12 WHEELS AND TIRES

Spigot mounted wheels shall be supplied for both front and rear assemblies. The Contractor shall determine the tire/rim size to suit the duty specified. Each terminal MHC must be equipped with a complete spare wheel.

13 OPERATORS CABIN

The MHC shall be provided with a weather-tight, totally enclosed, forced ventilated, air conditioned, single man, forward facing, forward control operator cabin, robustly designed and constructed to provide the Operator with a safe, practical and efficient working environment.

13.1 Access of Cabin

The cabin shall be equipped at least with a rear/side door opening.

13.2 Noise Level

The maximum noise level at the operator's head level shall not exceed the following decibel levels at the defined governed engine speeds with the MHC stationary on either concrete or asphalt pavement:
At operator's head level with doors and windows closed.

In operator's cabin – engine idle speed	max 68 dB (A)
In operator's cabin – engine governed speed	max 75 dB (A)

These noise levels shall be the maximum levels occurring while the MHC is operating on either a containers or general project cargo.

The combination of sound insulation, covering material and associated adhesives shall comply with local Health and Safety Requirements and the Contractor shall state the classification of this combination.

13.3 Windows

The cabin shall be fitted with fixed laminated front, rear and roof screens, door and off-side sliding windows mounted in rubber. All windows should be equipped with sun visors.

13.4 Windscreen Wipers and Washers

Electrically operated, self-parking windscreen wipers shall be provided for the front and rear windows.

13.5 Seat

An air suspended seat approved by Purchaser unit shall be fitted which has adjustments for height, distance from the front window, angle of squab, back rest and degree of suspension. The seat shall be covered in black ventilated, non-slip type material.

13.6 Conditioning and Ventilation

The air conditioning unit shall be sized to maintain internal cab temperature of 20°C maximum under all external ambient temperature conditions up to and including 45°C. An adjustable thermostat, within reach of a seated operator shall be provided.

Air-flow shall be arranged such that de-frosting and de-misting operations may be efficiently carried out on all primary windows.

13.7 Controls and Instruments

The Operator's cabin shall be equipped with the controls, instruments and warning alarms and CCTV monitor.

13.8 Flooring

To be designed to promote cleanliness by the elimination of recesses into which debris is likely to collect and where ribbed flooring is used to ensure that the ribs can be swept easily towards the door of the cabin.

13.9 Mobile Radio and Terminal RF Supply

Permanent mounting shall be provided inside the drivers' cabin at the front right-hand side at roof level in order that Purchaser can install a mobile communications radio unit. The enclosure shall permit a radio with the following maximum dimensions, H 6cm x W 19m x D 26cm, to slide into position and allow electrical connections to be made at the rear.

A regulated two Power Supply within the range 12 to 13.6 Volts DC (Negative Ground) shall be installed and protected through an appropriately sized circuit breaker. A cable shall be routed from a dedicated Circuit Breaker to the radio enclosure. Current drain characteristics for this type of radio equipment shall not exceed 10 Amps.

An aperture shall be provided at or near radio location for installation of coaxial R 58 cable connecting to an externally mounted aerial. Aperture shall be fitted with appropriate waterproof fitting ready for acceptance of coaxial cable.

13.10 Additionals

A. Folding seat in operator cab with safety belt
B. Sun protection

14 Spreader

Item	Purchaser's Specification
Lift Capacity (Single Lift - Concentric)	41MT
Lifting lug capacity (each)	10MT
Unit Weight	9-12MT
Expand Time from 20ft to 40ft	Approx. 30 sec
Retract Time from 40ft to 20ft	Approx. 30 sec
Twist-lock Rotation Time	Approx. 1 sec
Levelling Time 0 to ± 1.2m	20-30 sec
Flipper Operation Time	5 sec

15 ADDITIONAL FEATURES

The following additional features are required:

A. Digital Services Standard Package
B. Remote MHC access
C. Spreader Communication
D. Twin lift Spreader (60t) with Twin-twenty detection system (TTDS)
E. Tandem lift Assistant (includes Vertical Lift Assistant)
F. Traveling with extended stabiliser beams
G. Smoke detector system
H. Fire extinguishing system (diesel + electrical room)
I. Automatic lubrication of rope pulleys on tower, boom and chassis
J. Cable reel for auxiliary power supply with 50m cable
K. Heating system for hydraulic oils tank
L. CCTV cameras: engine compartment, EE compartment, machinery house
M. Obstacle beacons for boom and tower tip, blinking
N. Ready for electrification
O. Emergency startup possibilities in case of complete engine failure – solution offered by producer for evaluation
P. Supplier will include in an offer cost of mounting radio and tablet provided by the buyer on each crane.

16 PAINTING SYSTEM

16.1 Painting System

A. During construction and after fabrication has been completed, the MHC shall be thoroughly cleaned and painted in a manner as specified using paint products approved by the Purchaser and in accordance with paint manufacturer's instructions.

B. Painting system shall be suitable for "Exterior exposed polluted coastal atmosphere" and in accordance with the following standard or equivalent:

- DIN EN ISO 12944-5:2008-01 Corrosion protection of steel structures by protective paint systems

- Blast clean surfaces to Sa 2.5 according to DIN EN ISO 8501 – 2007 – Preparation of steel substrates before application of paints and related products.

Typical time to first maintenance shall be 10 – 15 years (Protection Class C5-M and durability class m according to ISO 12944).

16.2 Galvanizing

A. Fabricated Steel Ladders, walkways and handrails shall be Hot Dip Galvanized in accordance with EN ISO 1461:2009 – Hot Dip galvanized coatings on fabricated iron and steel articles to a minimum average thickness of 85 microns.

B. If not, hot dip galvanized steel is used for Ladders walkways and handrails they shall be made from aluminium.

16.3 Color

A. The crane shall be painted in ICTSI corporate colours which are predominantly Traffic Orange (RAL2009) and Traffic White (RAL 9016) with system and preparation to be approved by the Engineer. Refer to below Appendix for details.

PAINT COLOR	ITEM	COMMENTS
Traffic Orange RAL 2009	Main Steel Structure Mast & Tower	
	Sheaves	
	Cabin Platform	
	Boom and Boom Hydraulic Cylinder	
	Undercarriage	
Traffic White RAL 9016	Operators Cabins	Exterior only
	Electrical House	Exterior and Interior except floor
	Machinery House	Exterior and Interior except floor
Traffic Yellow RAL 1023	Spreader	Excluding Flippers, for flipper colours refer to Purchaser Requirements
	Stairways	Treads of Stairways may be left in galvanized condition
	Handrails	
	Rotator	
	Guards	Around machinery, wheels, couplings etc
	Ladders	Including hoops
	Outrigger Pads	
	Crosshatching on outriggers and counterweight	
	Test Weight Container	(If ordered)
Traffic Black RAL 9017	Operators Cabins	Interior Only

Traffic Grey RAL 7042	Floor of Operators Cabin	
	Floor of Electrical House	
	Floor of Machinery House	

16.4 Asset Number and Decals:

A. Purchaser's Logo shall be applied in two positions on the Machinery House and two positions on the Tower which are to be advised following contract award.

B. Crane Asset Numbers shall be applied by the crane manufacturer according to Purchasers requirements on the Undercarriage (4 Positions) to be advised after award of contract.

C. Warning signs and SWL capacity signs shall be applied according to the crane manufacturer's recommendations.

D. Manufacturer's name plate could be placed on crane, but the size and location must be approved by the Purchaser. Manufacturer's logo and/or nameplate lettering shall not be larger than ICTSI corporate lettering.

E. Each item of machinery shall be properly labelled for its direction of motion or operation and for any precautions to be taken before operation or maintenance.

F. All labels and safety notices applied throughout the crane shall be provided in dual language English and local (Polish). The Purchaser will provide translation of the English label into local language (Polish) but all labels shall be offered to the Purchaser for approval before manufacture.

Description of Equipment	Purchaser's Asset Number	Comment
Mobile Harbour Crane	MHC03	
Mobile Harbour Crane	MHC04	

Asset Numbers colour is Traffic Black RAL 9017 in Arial Bold Font x 250mm High

17 ENDURANCE TEST

1. The Endurance Test forms part of the Tests on Completion. The MHC (s) shall be required to undergo a test to demonstrate the combined operation of all Crane systems and the reliability of the components. The endurance test shall consist of repetitive cycling as follows whilst handling the Crane's rated load

2. This cycle is a preliminary proposal, and the final test cycle shall be determined by the Crane configuration and in agreement with the Purchaser.

3. The cycling test shall be continued for a period of 24 hours, minor malfunctions which only require single reset will be accepted during the first 16 hours, but the final 8 hours shall be fault free. In the event of a malfunction during the final 8 hours, the test shall be repeated until 8 hours of trouble free operation has been logged.

4. Throughout the period of testing the current, voltage, speed, main drive mechanism temperature, noise and vibration shall be recorded at intervals of 60 minutes. Any malfunctions or problems and any remedial action taken during the test shall be recorded.

18 MAINTENANCE TOOLS

18.1 ELECTRICAL/ELECTRONIC TOOLS

One laptop /diagnostic tool/ with original software to communicate with Engine Control Module (ECM) and Transmission Control Module (TCM) shall be provided along with any instructions for use. The operating license shall be assigned to the Purchaser, and training shall be provided for its application.

18.2 Mechanical Tools

The following mechanical tools shall be provided per contract:

I. Plug-in pressure gauges for the Hydraulic System - two (2) sets.
II. Set of long access Allen and Torx Keys to adjust hydraulic pumps, fit solenoids and maintain other hydraulic components - two (2) sets.
III. Torque Wrench with socket sets – two (2) sets.
IV. Tool Box – two (2) sets.

19 DEFECT LIABILITY PERIODS (DLP)

Entire MHC & accessories after taking-over	2 Years
Structure	7 Years
Paint	7 Years
Galvanizing	7 Years
Components repaired during DLP	1 Year or balance of DLP
Software upgrades	Throughout DLP

20 SAFETY, INSPECTION, DRAWINGS & MAINTENANCE MANUALS

20.1 SAFETY PROVISIONS

In the design and construction of the MHC, all local safety legislation shall be observed.

20.2 INSPECTION

A. Contractor shall submit a “Tests on Completion” schedule 4 weeks prior to “in house” testing for Purchasers review.

B. The Purchaser may carry out of inspections prior to and during manufacture at the Contractor's works either with one of his own inspectors or by an outside appointed inspector. The contractor shall allow access for the purpose of these inspections.

20.3 DRAWINGS

A. Following placement of the order, the contractor shall submit for review to the Purchaser general arrangement, fully dimensioned detail drawings and schematic diagrams.

B. The drawings and diagrams shall be checked by the purchaser so far as it is possible with the information in his possession.

C. Approval of drawings, whilst made in good faith, does not remove from the contractor his responsibilities and does not carry with it responsibility for subsequent alterations which the contractor may find necessary as the work proceeds.

D. The contractor shall provide two copies of the above drawings as modified and approved immediately prior to commencement of Acceptance Testing.

E. On completion of the contract, a copy of 'as made' drawings shall be supplied on disc or CD in PDF Format, and copies of spare part schedules shall be supplied at the Contractor's expense to the purchaser within one month of Completion.

F. The drawings shall include such details as:-

i. Circuit diagrams, wiring diagrams and schematic diagrams of all electrical equipment.
ii. Hydraulic schematics, piping diagrams.
iii. Fully dimensioned detail drawings of all major components and assemblies.

G. General Arrangement of the MHC.

20.4 MAINTENANCE AND OPERATION MANUALS

A. Four copies of good quality printed maintenance instruction manuals per contract in English and Polish language covering in detail the operation and maintenance of the MHC shall be provided immediately prior to Acceptance Testing. A PDF copy of the maintenance manual shall also be provided separately.

B. The following shall be included in the Maintenance Manual:

I. Index.

II. Full technical specification and detailed description of the terminal MHC as a whole and of each item of machinery and equipment for guidance of the maintenance staff and management. Where the Contractor's standard published literature is used, it shall be suitably edited to delete irrelevant information.

III. General arrangement and layout drawings in PDF format (Minimum A2 size), with appropriate cross-referencing to other drawings), schematic diagrams for power and control circuits whether electrical or hydraulic etc. The control sequence shall be fully described. General arrangement drawings shall show all leading dimensions, and a visual chart of safe working loads.

IV. Performance characteristics, copies of Works and Site Test Certificates, recommended settings of adjustable features, necessary.

V. Detailed list of all "As-Fitted" drawings as called for under the contract and supplied separately.

VI. Recommended schedules and programs for inspection, lubrication and routine maintenance. Lubrication charts and specifications. Full technical details for operation, adjustment, maintenance and testing of equipment and control.

VII. A means shall be provided for systematic trouble shooting, to enable detection and analysis of faults, with recommendations as to dealing with different types of problems likely to arise. This shall take the form of a compendium of cause/effect/solutions based upon experiences reported by users of the equipment split between electrical and mechanical systems.

VIII. Dismantling, repair, assembly, setting up and testing procedures and instructions, including electronic 'black box' units, for the whole of the equipment being purchased, fully illustrated. These shall include exploded views of all main components with part numbers shown to assist in dismantling and re-assembling complicated items and for identifying replacement parts.

IX. Spare parts lists, Contractor's part numbers and the actual source manufacturers (if applicable), part numbers, together with source manufacturers address for ease of cross reference identification when ordering.

X. Special tools and instruments required, if any, for testing, maintenance and repair work.

XI. Description of special safety features such as safety interlocks; limits; indication; warning and cut-out devices, etc. Testing adjustment and maintenance procedures for such devices and circuits. Special hazards and precautions to be taken by maintenance staff.

C. Two copies of good quality printed Operation Manual per MHC in English and local language /Polish/ covering in detail the operation and maintenance of the MHC shall be provided immediately prior to Acceptance Testing. A PDF copy of the maintenance manual shall also be provided separately.

D. The following shall be included in the Operation Manual:

I. Index

II. Full technical specification and detailed description of the MHC as a whole and of each item of machinery and equipment for guidance of the operation staff and management. Where the manufacturer's standard published literature is used, it must be suitably edited to delete irrelevant information.

III. Description of special safety features such as safety interlocks; limits; indication; warning and cut-out devices, etc. Operating procedures for MHC. Special hazards and precautions to be taken by Operation staff.

IV. The operating instruction manual shall clearly state the start-up procedure of every device on the MHC including all bought-in equipment, and all the points to be observed or checked during the start up.

V. Corrections shall be made for any changes made in the instructions during the commissioning period, and the revised instruction books shall be submitted one (1) month after the notification of successful completion of the Tests on Completion of the first Terminal Trailer(s)

Manuals	**Language**	**Copies / Order**
Operators manual	Polish , English	4
Maintenance manual	Polish , English	4
Spare parts manual	English	4

21 TRAINING

21.1 Product Training

A. The Contractor shall provide detailed Technical Training (Basic and Advanced) for four Purchaser’s engineers at the Purchaser’s Site for a period of three full working days.

B. The following shall be included:-

I. Training documentation and or materials as required.
II. Certificate of Attendance for each attendee of manufacturers training completed.
III. Details of course content shall be submitted to the Engineer at least 1 months before the scheduled delivery date.