Mounting – Demounting Wheel set press Comparison

รายละเอียด Specification ดังเอกสารแนบ Appendix 3 เปรียบเทียบอุปกรณ์ ในเอกสารสัญญาก่อสร้างก่อนทำ VE Specification 1 และ รายละเอียดอุกรณ์ที่ทำ VE แล้ว Specification 2 มีดังนี้

Here is a comparison of the technical specifications for the two Mounting – Demounting Wheel set press Comparison, presented in a table format.

New specification

Feature	ตามข้อกำหนดสัญญา	ที่นำเสนอ	Remark
	Specification 1	Specification 2	
Working Conditions			
Environment Temp.	- 5° to 45°C	- 5° to 45°C	ตามข้อกำหนดสัญญา
Max Relative Humidity	100%	100%	ตามข้อกำหนดสัญญา
Noise level	≤ 75 dB(A)	≤ 75 dB(A)	ตามข้อกำหนดสัญญา
Main Technical Specification			
Wheel press force			
- Press-on	145 tons	145 tons	ตามข้อกำหนดสัญญา
- Press-off	400 tons	400 tons	ตามข้อกำหนดสัญญา
No. of cylinder	-	2	ดีกว่าข้อกำหนดสัญญา
Cylinder			
- Diameter	600 mm	≥ 410 mm	ดีกว่าข้อกำหนดสัญญา
- Stroke	700 mm	≥ 700 mm	ดีกว่าข้อกำหนดสัญญา
Cylinder speeds			
- Rapid approach	40 mm/s	≥ 10 mm/s	ดีกว่าข้อกำหนดสัญญา
- Retract	60 mm/s	≥ 10 mm/s	ดีกว่าข้อกำหนดสัญญา
- Pressing (Variable)	5 mm/s	≥ 0.5-5 mm/s	ดีกว่าข้อกำหนดสัญญา
Moveable resistance beam			
- Min opening	889 mm	889 mm	ตามข้อกำหนดสัญญา
- Max opening	3,429 mm	3,429 mm	ตามข้อกำหนดสัญญา
Tension bars			
- Diameter	250 mm	250 mm	ตามข้อกำหนดสัญญา
- Vertical distance	1,500 mm	1,500 mm	ตามข้อกำหนดสัญญา
Hydraulic unit			
- Hydraulic tank	400 litres	≥ 650 litres	ดีกว่าข้อกำหนดสัญญา
- Working Pressure	250 bars	≥ 315 bars	ดีกว่าข้อกำหนดสัญญา
- Recommended oil	ISO VG46	ISO VG46	ตามข้อกำหนดสัญญา
Installed powers			
- Hydraulic power unit	30 kW	≥ 30 kW	ดีกว่าข้อกำหนดสัญญา
- Accessories	10 kW	≥ 10 kW	ดีกว่าข้อกำหนดสัญญา
Total power required	32 to 40 kW	32 to 40 kW	ตามข้อกำหนดสัญญา
Overall dimensions			
Length	8,500 mm	8,500 mm	ตามข้อกำหนดสัญญา

New specification

Feature	ตามข้อกำหนดสัญญา	ที่นำเสนอ	Remark
	Specification 1	Specification 2	
Width	2,500 mm	2,500 mm	ตามข้อกำหนดสัญญา
Height	3,000 mm	3,000 mm	ตามข้อกำหนดสัญญา
Space in BWS	-	-	ตามข้อกำหนดสัญญา
Weight of the press	20,000 kg	20,000 kg	ตามข้อกำหนดสัญญา
Wheel Press Capacities			
Track gauge	1,000 mm	1,000 mm	ตามข้อกำหนดสัญญา
Wheel set			
- Max weight	2,500 kg	2,500 kg	ตามข้อกำหนดสัญญา
- Min/Max length	1,000 to 2,500 mm	1,000 to 2,500 mm	ตามข้อกำหนดสัญญา
Wheels			
- Max diameter	1,250 mm	1,250 mm	ตามข้อกำหนดสัญญา
Brake discs			
- Diameter	610 mm	610 mm	ตามข้อกำหนดสัญญา
- Width	110 mm	110 mm	ตามข้อกำหนดสัญญา
Gear wheel			
- Diameter	825 mm	825 mm	ตามข้อกำหนดสัญญา
- Width	175 mm	175 mm	ตามข้อกำหนดสัญญา
Pressing precisions			
Wheel set	± 0.3 mm	± 0.3 mm	ตามข้อกำหนดสัญญา
Brake disc	± 0.5 mm	± 0.5 mm	ตามข้อกำหนดสัญญา
Gear wheel	± 0.5 mm	± 0.5 mm	ตามข้อกำหนดสัญญา
Accuracy of component	-	+/- 0.2 mm	ดีกว่าข้อกำหนดสัญญา
Resolution of position	-	< 0.02 mm	ดีกว่าข้อกำหนดสัญญา
Force monitoring accuracy	-	+/- 5,000 N	ดีกว่าข้อกำหนดสัญญา
Force monitoring resolution	-	< 900 N	ดีกว่าข้อกำหนดสัญญา
Positioning measurement accuracy	-	+/- 0.1 mm	ดีกว่าข้อกำหนดสัญญา
Positioning measurement resolution	-	< 0.02 mm	ดีกว่าข้อกำหนดสัญญา
Production performances			
Wheelsets per hour	3 Wheel sets	3 Wheel sets	ตามข้อกำหนดสัญญา
Average cycle time	5 min	5 min	ตามข้อกำหนดสัญญา

New specification

Feature	ตามข้อกำหนดสัญญา	ที่นำเสนอ	Remark
	Specification 1	Specification 2	
Cycle times for wheelset assembly/disassembly			
- without brake disc	-	< 10 minutes	ดีกว่าข้อกำหนดสัญญา
- with brake disc	-	< 20 minutes	ดีกว่าข้อกำหนดสัญญา
Power supply			
Operating Voltage & Freq.	380 V, 50 Hz	380 V, 50 Hz	ตามข้อกำหนดสัญญา
Control voltage			
- main circuit	220 V, 50 Hz	220 V, 50 Hz	ตามข้อกำหนดสัญญา
- auxiliary circuit	24 V	24 V	ตามข้อกำหนดสัญญา
Voltage fluctuation	±10%	±10%	ตามข้อกำหนดสัญญา

สรุปจากการเปรียบเทียบข้อกำหนดนี้จึงขออนุมัติเปลี่ยนแปลงข้อกำหนดในจัดซื้อจัดจ้างตาม APPENDIX3 SPECIFICATION 2

APPENDIX 3

ที่นำเสนอ SPECIFICATION 2

STATE RAIL WAY OF THAILAND TENDER

SPECIFICATION FOR

MOUNTING & DEMOUNTING WHEEL SET PRESS

AT KAENG KHOI NEW DEPOT

SCOPE

This specification covers the supply and delivery of one unit of Wheel set press including installation of the Wheel set press for State Railway of Thailand (hereafter referred to as SRT).

The Wheel set press shall be a heavy-duty machine of the latest and modern design for railway application. It shall be supplied complete in every detail with all equipments, accessories. The delivery of the Wheel set press shall be fully assembled including its complete installation for operation at Kaeng Khoi new depot.

Proposals

Technical description features and specification of the proposed Wheel set press shall meet all the terms and requirements in this specification and shall be submitted with the proposal for consideration accompanied with diagram, illustrations and general arrangement drawing(s) of the machine.
Only the Wheel set press with good performance and successfully operation record will be considered. Tenderer shall supply along with his proposal the certified documents for quality and efficiency of the proposed Wheel set press.

SRT reserve the rights to investigate all the document that bidder submitted

GENERAL FEATURES

The Wheel set press shall be operated for mounting and demounting of either double or single Wheel Set with different type and sizes of locomotives, railcars, passenger coaches freight cars and breakdown crane train as shown in the attached drawing in Clause 4. The Wheel Set Press shall be used for following types of operations as Wheel mounting and demounting, Drive Gear mounting and demounting, Bearing mounting and demounting (both inside and outside), Brake disc mounting and demounting.

The wheel set press shall be integrated the latest technical improvements, for efficient and ergonomic operation as Ergonomic and safe operation post, Rigid (powerful cylinder and massive movable resistance beam), Compact and proven design, Equipped with double cylinders, Moveable resistance beam for mounting and demounting operations, Double action hydraulic press cylinder, Equipped with various interchangeable tools on cylinder and resistance beam, Equipped with a Computer Control System to monitor cylinder, position, pressure, data loading to wheel press recorder and only one operator is necessary to operate the wheel set press

The brief of the above design and arrangement shall be submitted together with the proposal. The preferable wheel set press shall be given to modern design that shows advantage in the above matters and simpler movement in operation. All machine parts and functions shall be guaranteed for Thai climates

TECHNICAL DATA

The specification of the proposed wheel set press shall be based upon the following technical data:

Working conditions	Environment temperature	-5° to 45°C
	Max Relative Humidity	100%
Noise level	1 meter for the noise source	≤ 75 dB(A)

Main Technical Specification

Wheel press force	Maximum press-on pressure	145 tons
	Maximum press-off pressure	400 tons
Number of cylinder		2
Cylinder	Cylinder Diameter	≥ 410 mm
	Cylinder stroke	≥ 700 mm
Cylinder speeds	Rapid approach speed	≥10 mm/s
	Retract speed	≥10 mm/s
	Pressing speed (Variable)	≥ 0.5-5 mm/s
Moveable resistance beam	Minimum opening to abutment	889 mm
	Maximum opening to abutment	3,429 mm
Tension bars	Diameter	250 mm
	Vertical distance between tension bars	1,500 mm
Hydraulic unit	Hydraulic tank	≥ 650 litres
	Working Pressure	≥ 315 bars
	Recommended oil	ISO VG46
Installed powers	Hydraulic power unit	≥30 kW
	Accessories	≥10 kW
	Total power required	32 to 40 kW
Space in BWS		4,000 x 3,000 mm
Overall dimension of Machine	Length	8,500 mm
	Width	2,500 mm
	Height	3,000 mm
Weight of the press	Approximate net weight	20,000 kg
Wheel Press Capacities		

Track gauge		1,000 mm
Wheel set	Maximum wheel set weight	2,500 kg
	Min/Max wheel set length	1,000 up to 2,500 mm
Wheels	Maximum wheel diameter	1,250 mm
Brake discs	Diameter	610 mm
	Width	110 mm
Gear wheel	Diameter	825 mm
	Width	175 mm
Pressing precisions	Wheel set	± 0.3 mm
	Brake disc	± 0.5 mm
	Gear wheel	± 0.5mm
Production performances	Wheel sets per hour	3 Wheel sets
	Average complete cycle time	5 min
Accuracy of component		+/- 0.2 mm
Resolution of position monitoring		< 0.02 mm
Accuracy of press force monitoring device		+/- 5,000 N
Resolution of press force monitoring device		< 900 N
Accuracy of positioning measurement		+/- 0.1 mm
Resolution of positioning measurement		< 0.02 mm
Press cycle times for wheelset assembly/disassembly	wheelset without brake disc	< 10 minutes
	wheelset with brake disc	< 20 minutes
Power supply	Operating Voltage & Frequency (3Ø, 4-wire)	380 V, 50 Hz
	Control voltage	
	- for main circuit	220 V, 50 Hz
	- for auxiliary circuit	24 V
	Voltage fluctuation	±10%

4. APPLICATION DRAWINGS

The drawings and diagrams listed below are relevant locomotive, railcar, passenger and freight wheel sets used in SRT.

Wheel and axle	Dwg.No.	511D1-2010
Wheel and axle	Dwg.No.	611D1-1038/1
Wheel set	Dwg.No.	1-4001D1-001
Standard axle with axle-box assembly	Dwg.No.	TR8025132
Wheel and axle	Dwg.No.	2L107230-3021
Wheel and axle mounting	Dwg.No.	84D705067
Axle detail	Dwg.No.	C61819
Wheel set	Dwg.No.	2-3001D1-003
Driving wheel set complete	Dwg.No.	1-08-12.10.46
Wheel set I/III	Dwg.No.	628-111.01-00
Axle	Dwg.No.	218-111.11-01
Wheel and axle (D)	Dwg.No.	1-1101DRC1-001
Detail of axle (Power)	Dwg.No.	1110118
Assembly of wheel set (Power & Trailer)	Dwg.No.	5030368
Wheel and axle assembly	Dwg.No.	TR200013
Wheel & axle regauging	Dwg.No.	JRW-DR2-0009
Wheel & axle	Dwg.No.	1-6TP1-001/3
Wheel & axle	Dwg.No.	1-12-TP1-001
Wheel & axle with retyring rolled disc wheels	Dwg.No.	P1-2439/1
Wheel and axle	Dwg.No.	PG1-2106
Wheel & axle (type IV AP)	Dwg.No.	PG1-2151
Wheel & axle	Dwg.No.	JR-W1-001A
Wheel & axle (type V AP)	Dwg.No.	G1-2257/1
Layout of Makkasan wheel shop	Dwg.No.	Diagram A& B
WHEEL SET	Dwg.No.	QSJZ24-20-20-000
END-AXLE ASSEMBLY	Dwg.No.	TR.8023695
WHEEL SET	Dwg.No.	60352110000455
SOLID WHEELS & AXLE	Dwg.No.	34BTC1-2003
SOLID (MONOBLOCK) WHEELS & AXLE	Dwg.No.	PA-2602
WHEEL AND AXLE	Dwg.No.	17PK1-1001
การนำล้อพร้อมเพลาชนิดกาบเพลาเรียบขนาด 9” x 5” มาดัดแปลง เป็นล้อพร้อมเพลาชนิดตลับลูกกลิ้ง	Dwg.No.	267T
WHEELS & AXLE	Dwg.No.	31016
SOLID WHEELS & AXLE	Dwg.No.	DP1-2600

SOLID WHEELS & AXLE	Dwg.No.	JR-W1-004
SOLID WHEELS & AXLE	Dwg.No.	P1-2603
SOLID (MONOBLOCK) WHEELS & AXLE	Dwg.No.	P1-2605
BREMSSCHEIBE 610/322X110 GETEILT/SPLIT/DIVISE BRAKE DISC/DISQUE DE FREIN	Dwg.No.	B81377/1
SOLID (MONOBLEOCK) WHEELS & AXLE	Dwg.No.	P1-2606/1
SOLD (MONOBLOCK) WHEELS & AXLE	Dwg.No.	P1-2608
AXLE	Dwg.No.	P1-2607
WHEEL & AXLE	Dwg.No.	1GD1-2009
WHEELS AND AXLES 3"-3 3/8" GAUGE TRACK (METER GAUGE)	Dwg.No.	31-66993
WHEELS & AXLE (TYPE II AP) WITH SOLID ROLLED STEEL WHEELS FOR ROLLER BEARING	Dwg.No.	3GA1-2052
WHEELS AND AXLE	Dwg.No.	G1-1116
WHEELS & AXLE (TYPE III AP) WITH RETYRING ROLLED DISC WHEELS FOR ROLLER BEARING	Dwg.No.	G1-2275
SOLID (MONOBLOCK) WHEELS & AXLE	Dwg.No.	G1-2322
WHEELS & AXLE (TYPE IV AP) WITH RETYRING ROLLED DISC WHEELS FOR ROLLER BEARING	Dwg.No.	PG1-2151
SOLID (MONOBLOCK) WHEELS & AXLE	Dwg.No.	G1-2311/1
SOLID (MONOBLOCK) WHEELS & AXLE	Dwg.No.	G1-2317/1

5. EQUIPMENT OF THE MACHINE

5.1 The press consists with machine frame, main column, movable resistance column.
rear column, hydraulic system, control system, and auxiliary equipment, etc.

5.2 The main column, movable resistance column and rear column shall be of rigid welded steel construction and fully stress relieved.

5.3 The machine frame shall be a strongly ribbed heavy-duty cast steel or rigid welded steel frame, fully stress relieved, suitable to support the three columns with wide and sturdy guide way(s) for the movable resistance column. Painting shall comply with standard RAL.

5.4 The main column and rear column shall be rigidly joined to one another by connecting rod(s) or bar(s). The connecting rod(s) or bar(s) shall be supported the resistance column during mounting and dismounting operations. The rod(s) or bar(s) shall be equipped with positioning steps on their lengths for resistance head positioning depending on wheel set lengths.

5.5 The main column shall be provided with hydraulic press cylinder and centering device intended to center the wheel to be pressed on or off to pressing axis. The cylinder shall be made steel forging and grounded chrome plate on rod. The front side of the cylinder face shall be equipped with a replaceable wearing plate/insert. The cylinder shall be equipped with a
setting pressure sensor. This sensor shall be supplied with its calibration certificate.

5.6 The movable resistance column shall be provided with a U-shaped gap open to the front for accommodating of wheel set with axle gear and brake discs or parts between the wheels. The resistance column shall be moved on guide way(s) of the machine frame to the required position by mean of motor driven.

5.7 Additional centering device or support shall also be provided with rear column or suitable location if necessary.

5.8 Auxiliary overhead crane or electric hoist for raising and positioning of the wheel set or work piece in and out the press during the process.

5.9 The CNC or PLC control system of well proven type shall be provided incorporated with measuring system of working distance in order to allow assembly of component pairs with a single positioning of the press, without 180 °C rotation of the axle, recording devices to record the pressing force in dependence on pressing path and operators control components or push-
buttons grouped in main control panels, etc. For maintenance purpose, the SRT would like to standardize the PLC Model S7 or the latest improvement made by SIEMENS of GERMANY. All electronic components and switchgears for the control system should be installed in steel-sheet cabinet with IP54 protection or better.

Both manual and automatic modes are automatically locked. Position
reference or pressing force can be automatically adjusted.

5.11 The Auto-diagnosis system shall permanently control following items:

- Mode of operation
- Oil level
- Oil temperature
- Main press cylinder operating pressure
- Press speed
- System faults
- Hydraulic oil filter clogging with automatic shutdown if not replace within 72 hours

5.12 The PLC shall be equipped with automatic defects detection device, to find the origin of default in case of malfunction of the machine. The control detection of the machine is performed by means of detectors installed on hydraulic, mechanical, electrical, oiling systems. As soon as a default is detected, a clear message is displayed on PC screen to inform the operator and the machine is stopped automatically if necessary.

5.13 The press shall have at least (2) two solutions for mounting measuring for wheel sets, brake discs and gear wheels on their axles.

5.13.1 Measuring of positioning by means of “Calculation” is performed by the wheel press by means of encoders installed on the cylinder for wheel set length measuring and on its motion to measure the mounting precision. Position of components to be mounted is calculated according to the axle extremity.

5.13.2 Measuring of positioning by means of “Measuring Arm” is measuring system ensures the detection back to back dimensions of the wheel set and is used for dynamic measurement of wheels displacement during pressing. Direct reading on inside faces of the wheel shall be mechanical probes or lasers. All measured data shall are done in real time to allow curve printing or display.

5.14 Computerization of displays and user interface

5.14.1 User interface:

The interface is used to control the press and plot setting curve with computer. Operator help windows shall be as easy using. The screens for operators shall bein English language.

The software shall automatically record the press-fit curves of wheel set, brake discs or wheel gears, and automatically judge whether the pressing curves are correct or not. For correct ones, a clear message is displayed on the PC screen giving data and reason of the deviation.

5.14.2 Cycle working:

- Automatic initialization of measuring system.
- Verification of available space on hard disk.
- Checking emergency stop & resetting, hydraulic unit, oil level, etc.
- Recall of preparation file on basis of work order number.
- Verification of preparation data by operator with possibility of modification.
- Validation of preparation data for transmission of setting parameters to the control unit
- Choice of part to be set and follow-up of setting curve on the screen during cycle starts(operation to be repeated twice in case of 2 wheels, etc.).

- Automatic data saving on local hard disk.
- Printing of setting curves.

5.14.3 Utilities:

- Reopening of a previous pressing file and report printing.
- Adjustment of the theoretical pressing speed.
- A “calibration” page will allow user to calibrate pressure sensor using your calibrating pressure gauge.
- Maintenance pages (Access protection by password).
- Control of inputs and outputs for easier maintenance.
- Management of a database of machine constants (such as: angle of rest for measuring equipment, appearing dimensions, adjustments of offsets and coefficients for analogue input, etc.).
- Management of axle’s database (such as: theoretical inside faces, theoretical setting length, angle for parts to be set, etc.).

5.14.4 Wheel press chart recorder and data storage unit:

The press shall be fitted with computerized wheel press chart recorder and data storage.

The principal elements of the unit include:

- Display and storage unit contain the operator’s data entry, screen and wheel chart.
- Pressure transducers.
- Displacement transducers.

The recorder unit shall contain data storage to compile following information and not limited to:

- Date and time of the wheel mount or demount.
- Operator identification code.
- Mount or demount side of axle (left / right).
- Maximum force.
- Axle serial number, type and size.
- Wheel serial number, manufacturer, type and size.
- Total mounts for the day and month.
- Resistance head position.
- Graph indicating the mounting curve, referring to force and the travelled length.
- Backpressure test (Diagram force vs time).
- Result of the components mounting position and wheel gauge.

The recorder shall monitor the wheel press force applied, distance and plots the press force diagram(press force versus wheel-axle displacement) on visual display screen. The diagrams shown on the screen and back to back distance can also be recorded and results can be sent to the printer.

5.14.5 Computer hard ware and software include:

Industrial Grade Computer include.

- Display : LCD TFT da 21,5" W 16:9 ▪ 1920x1080 (FHD), 16M colours capacitive Touch-Screen, Aluminium and glass front panel.
- CPU : Intel® Core i5-1145G7E, Quad Core or.
- Communication Ports : 3x GbE Lan RJ-45, 1xRS-232(COM1), 1xRS-232/422/485(COM2), 4xUSB 3.0 type A, 1xDB-9, 1xDP/HDMI, 1XAudio Line Out.
- Power Supply : 9-36VDC (isolated power supply).
- UPS : UPS for PC.
- Window 11 IoT Enterprise.
- Automatic Backup data system on additional local gard drive.
- UBIQUITY Pro Win32/64.
- Keyboard.
- Mouse.
- Internet security antivirus software for 3 years.
- A4-laser printer.
- UPS.

Main functions of PC software are:

- Interface with the operator.
- Command of the press and its accessories.
- Control on the safety devices.
- Data storage for pressing pressure and history of pressing.
- Pressing cycle.
- Control of defects of the press and its accessories.
- Tele-maintenance of the press and its accessories.
- Printing or exporting of pressing reports .

5.15 One hydraulic power unit complete with pump, filters, gauges, valves, pressure regulator and necessary connection, etc. for generating high- pressure hydraulic oil for the machine operation.Specification of hydraulic unit comprising:

- A tank equipped with an electric contact type level detector, a 10 µm breather plug, a draining pipe and valve, a filling pipe equipped with a coupler and retaining tank.

- A motor-driven pumpunit, a self-regulating pump with pistons. This pump is coupled to a low pressure geared pump for rapid movements and control system.
- High-pressure filter with electric clogging indicator.
- Return filter.
- Filling of hydraulic generator via coupler with routing into return filter.
- Oil/air exchanger to regulate the oil temperature in the hydraulic generator (the difference temperature 10 °C between air and oil).
- Maximum working temperature 55 °C
- The motor-driven pump unit is installed on silent blocks on the hydraulic tank.
- An acoustic cover is placed on pumps in order ensure 75 dB(A) sound level.
- Distribution for the cylinder is provided in proportional hydraulic mode by servo valve. During mounting and demounting processes, cylinder speed is controlled by it.

- The hydraulic component are installed on block manifold.
- All solenoid valves are equipped with an indicator light.

5.16 Special tools for mounting and dismounting the wheel sets according to Dwg.No. TR8025132, 2L107230-3021, 84D705067, TR200013, PG1-2151 & G1-2257/1. And the detail drawings related to the necessary tools for other type of wheel sets mention in clause 4, for SRT to be able manufacture them by it.

5.17 Electric power cabinet shall supply an electric energy to the press. The electric cabinet comprising:

- Air-conditioned cabinet.
- Emergency stops with auto safety relays.
- Fault indicator lights.
- Control consoles for buttons required for manual operation.
- Lights in the wheel mounting zone.

5.18 The safety devices of the press are as follows:

- Emergency stop devices.
- Audio warning for movement of elevation platform.
- All motors shall have overload protection devices fitted.

- Low voltage working lights shall be provided illumination of the wheel mounting zone.

- Movement shall stop automatically, irrespective of force or position once the emergency stop button has been pushed.
- Other safety devices necessary to operate the press.

5.19 All necessary accessories i.e. service tools, gaskets and seals for the hydraulic system and one complete first hydraulic oil filling, etc.

5.20 Automatic loading/unloading carriage.

The carriage shall be designed to load a wheelset from the pre-fitting stand to the wheel press and to unload a wheelset from the wheel press to decided position. The operation time for loading to/unloading out of the wheel press shall be less than 5 (five) minutes.
The carriage shall also be designed to convey and adjust wheelset centering positions correspond to the press cylinders for assembly/disassembly process without utilizing overhead crane.

5.21 Pre-fitting stand.

The pre-fitting stand shall be designed and installed with emphasis on simplicity, reliability, ease of operation and free-maintenance. A position of the pre-fitting stand installation shall be concerned with workflow and operations.

6. INSTALLATION

The press shall be installed on the arranged area 4m X 3m at kaeng khoi new depot operation. The contractor shall be responsible for the following undertakings at his own expense.

6.1 Design and Construction of the foundation for installing the press. The foundation of the machine shall be designed and constructed solidly, and the machine must be firmly installed in vibration free manner. The foundation and machine base and other relevant equipment shall be elevated above the existing shop floor level least 300 mm in order to prevent the immersion during the flood. This arrangement of the machine has to be thoroughly considered and arranged that operation of the press will continue despite the flooding of the shop floor area.

6.2 Preparation, construction, and erection of foundation of the machine must be acknowledged and agreed by the SRT. The construction works shall begin at least 2 months before delivery date of the machine.

6.3 Commissioning of the press, checking the machine operation and the full functioning of its associated components shall be assured of satisfactory functioning of the machine as per specification under the contract.

7. SPARE PARTS

A complete list in itemized prices of recommendable spare parts from manufacturer to cover the service of the press for two years operation shall be quoted and submitted with the proposal for the SRT consideration.

8. INSTRUCTION ANDSHOP MANUALS

At least two copies of arrangement drawings, hydraulic and electrical diagrams, installation, operating and maintenance instructions including part catalogs and as well as other useful technical manuals that benefit to the user shall be submitted in English with the press. The necessary machine and maintenance tools for the press shall also be provided.

9. TRAINING

Necessary local training program for SRT's operators for proper operation and maintenance of the press shall be submitted with quotation. All expenses of this training shall be borne by the contractor.

10. REFERENCES AND INFORMATION FOR BIDDING EVALUATION

10.1 The manufacturer of the specified press shall be of international known reputation of which the production of this machine has to be of worldwide acceptance in proven quality, performance and durability as well as other engineering characteristics. Detailed of satisfaction shall be submitted for consideration.

10.2 Only the press with quite successfully supplied record to the well-known railway organizations or the organizations that do business with those railway delivered within the last past 5 years will be considered. Detailed specification including general drawings and illustrations of the previously delivered machines of same type shall accompany the proposal. Proposal without the said record will not be qualified.

10.3 The brief of the above design and arrangement shall be submitted together with the proposal. Moderns design that shows advantage in the above matters and simpler movement in the operation of the machine shall have better consideration.

11. CONTRACTOR'S RESPONSIBILITY

The contractor is to be entirely responsible for the efficient and assured performance and operation of the press notwithstanding any approval or acknowledgement by the SRT or of test carried out either by SRT authority or by the contractor. Required parts to be replaced shall be supplied free of charge within the period of guaranty.

The contractor or manufacturer shall guarantee for workmanship and quality or materials. Should any defect be found within two years after final acceptance by the SRT in Bangkok due to faulty materials, or bad workmanship, the contractor or manufacturer shall bear to replace free of charges and pay all expenses incurred or to remit to the SRT the cost of repair or to refund the amount paid for such defective material including all other charges if such expenses shall have been paid by the SRT, within one month from date of notification. The defective materials, if required, shall be delivered to the contractor or manufacturer at his own expenses.

12. PACKING AND SHIPPING

The wheel set press shall be carefully packed, preserved and protected for sea voyage and shipped. On arrival in Bangkok and transfer to Kaeng Khoi new depot at Saraburi province, if damages are found to have been caused by improper packing or protection, the contractor shall replace the defective parts free of all costs to the SRT with the least possible delay.

All packing cases are to be clearly marked in black with the initial letter "SRT", the order number and date, the Contractor's (or manufacturer's) name, the gross and net weights and port of destination. Each package shall be given a serial number corresponding to the number in shipping specification. Cost of packing is to be included in the contracted price.