



**GOVERNMENT OF TAMILNADU**  
**DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI**  
**STATE PROJECT COORDINATION UNIT**  
**(Established under Canada India Institutional Cooperation Project)**  
**CURRICULUM**

Course Name	<b>HEAVY MACHINERIES OPERATIONS &amp; MAINTENANCE HYDRAULIC EXCAVATOR- POCLAIN</b>
Course Code	ME /2020/015
Course Duration	60 Hours
Minimum Eligibility Criteria	8th Std
Pre-requisites (if any)	-
Course Objectives	Training module has been designed for the participants to <ul style="list-style-type: none"> <li>• Understand the Hydraulic system.</li> <li>• Understand the Fuel system.</li> <li>• Understand the Electrical system.</li> <li>• Understand the Transmission system.</li> <li>• Appreciate the safety practices.</li> </ul>
Course Outcomes	At the end of training, the participants will be able to <ul style="list-style-type: none"> <li>• Inspect the machine periodically.</li> <li>• Start and operate the engine.</li> <li>• Operate various lever in the Poclain.</li> <li>• Maintain and operate heavy machineries Poclain</li> </ul>
Expected Job Roles	Hydraulic Excavator Operator & Maintenance Technician

<b>TEACHING AND SCHEME OF EXAMINATION</b>						
Course Code	Course Name	Hours		Assessment Marks		Duration of the Examination
				Min	Max	
ME /2020/015	<b>HEAVY MACHINERIES OPERATIONS &amp; MAINTENANCE (HYDRAULIC EXCAVATOR- POCLAIN)</b>	Theory	20	10	20	3 hours
		Practical	40	40	80	
		Total	60	50	100	

**ME /2020/015 - HEAVY MACHINERIES OPERATIONS & MAINTENANCE(HYDRAULIC EXCAVATOR- POCLAIN)**  
**DETAILED SYLLABUS**

Unit No.	Modules	No. of Hours	
		Theory	Practical
<b>I</b>	<b>Machine parts and CAB features</b>	<b>14 Hours</b>	
1.1	Introduction to the Machine: Parts – General Information, Hydraulic System – Oil Tank System – Pump System – Types of Valves – Cylinder – Hydraulic Motor – Hydraulic Circuit Suction Stroke. Engine and Engine Parts Details: Engine – Parts – Fuel System – Power System.	08	
1.2	<b>Practical:</b> Operation Station CAB Features - Monitor Panel & Switch Panels - Engine oil Pressure - Coolant Temperature - Fuel Gauges & Hour Meter - Light & Key Switch		06
<b>II</b>	<b>Transmission System, Machine inspection</b>	<b>12 Hours</b>	
2.1	Transmission System – Wheel and Column System – Front and Wheel System Drive Axle: Drive Axle Assembly Unit – Differential Systems.	04	
2.2	<b>Practical:</b> <ul style="list-style-type: none"> <li>➤ Name and Function of Components of the machine</li> <li>➤ Pre Start Inspection                             <ol style="list-style-type: none"> <li>1. Inspect Machine daily before start</li> <li>2. Electrical, Fuel &amp; hydraulic system</li> <li>3. Boom, Sheet metal tracks &amp; Lubrication.</li> </ol> </li> </ul>		08
<b>III</b>	<b>Hydraulic circuits</b>	<b>20 Hours</b>	
3.1	Oil Operating System: Oil Operating System – Hydraulic oil and circuits – Brake and break Circuits.	04	
3.2	<b>Practical:</b> <ul style="list-style-type: none"> <li>➤ <b>Operation</b></li> <li>➤ Starting the engine - Careful operation - Levers operation.</li> </ul>		16
<b>IV</b>	<b>Safety aspects</b>	<b>8 Hours</b>	
4.1	Safety: Protective Clothing – Prepare for Emergencies – Inspect Machine- Keep Riders off Machine – Avoid Power lines- Move and Operate Machine Safety – Basic Traffic rules with road signals.	02	
4.2	<b>Practical:</b> <ul style="list-style-type: none"> <li>➤ Driving the Machine</li> </ul>		06
<b>V</b>	<b>Machine Maintenance</b>	<b>6 Hours</b>	
5.1	Importance Machine Maintenance	02	

5.2	<b>Practical:</b> ➤ Maintenance aspects of various parts of the machine		04
<b>Total Theory and Practical hours</b>		<b>20</b>	<b>40</b>
<b>Total hours</b>		<b>60</b>	

#### HARDWARE REQUIREMENT

S. NO.	LIST OF TOOLS / EQUIPMENTS
1.	Open End, Closed end, combination Spanners
2.	Adjustable Spanner
3.	Socket set, Tubular Spanner
4.	Cutting Pliers, Circlip Pliers,
5.	Screw Driver set, Files, Hacksaw frame and Hacksaw
6.	Torque Wrench

#### REFERENCE BOOKS

S. NO.	NAME OF THE BOOK	AUTHOR	PUBLISHER
01	Construction Equipment Management	John E. Schaufelberger and Giovanni C. Migaliaccio	Routledge, New Delhi
02	Construction Equipment Guide	David A. Day and Neal B.H. Benjamin	John Wiley & Sons, New Jersey
03	Hydraulic Systems for Mobile Equipment	Timothy W. Dell	Goodheart-Willcox Company, USA
04	Excavator operator facilitator guide	---	Infrastructure Equipment Skill council, Bangalore

### ASSESSMENT AND CERTIFICATION

S. No.	Criteria for Assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory and Practical.
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions)
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training , Certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

### END EXAMINATION

#### ALLOCATION OF MARKS

S.NO	Description	Max.Marks
1.	Theory Examination	20
2.	Practical Examination	
	a) Aim and Procedure	20
	b) Demonstration / Execution	25
	c) Result & Viva Voce	15
	d) Record	20
Total Marks		100

## THEORY MODEL QUESTION PAPER

ME/2020/015 – HEAVY MACHINERIES OPERATIONS & MAINTENANCE (HYDRAULIC EXCAVATOR – POCLAIN)

(Maximum marks: 20)

(N.B: Answer any **Twenty** questions)

**20x1=20 Marks**

1. What are the advantages of hydraulic system?
2. Mention any two type of hydraulic cylinder.
3. Write any two parts of IC engine.
4. Write any two use of hydraulic motor
5. What is stroke in engine?
6. Write any two parts of transmission system.
7. What is clutch?
8. Write any two types of gearbox.
9. What is meant by differential?
10. Write any two parts of drive axle.
11. What is meant by oil operating system?
12. Write any two types of brake system
13. What are the parts in oil operating system?
14. Write any two type of oil used.
15. How do we check engine oil level?
16. Write any two types of signal indicators.
17. Write any two basic traffic rules.
18. What is the use of boom cylinder?
19. How many levers are used to operate backhoe?
20. What is backhoe loader?
21. Write any two switches in control panel.
22. How many lever used to operate bucket?
23. What is bucket cylinder?
24. What do we check first before starting engine?
25. Write any two electrical switches on control panel.