



Model Curriculum

Iron & Steel – Excavator Operator

SECTOR: IRON & STEEL
**SUB-SECTOR: STEEL SPONGE IRON, FERRO ALLOYS,
RE-ROLLERS, REFRACTORY**
OCCUPATION: Iron Making
REF ID: ISC/Q0404
NSQF LEVEL: 3



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

INDIAN IRON AND STEEL SECTOR SKILL COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack **Excavator Operator** OP No. ISC/Q0404 NSQF Level 3

Date of Issuance: **December 22nd, 2015**

Valid up to: **December 21st, 2016**

* Valid up to the next review date of the Qualification Pack


Authorised Signatory
(Indian Iron and Steel Sector Skill Council)



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IRON & STEEL - EXCAVATOR OPERATOR

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Iron & Steel - Excavator Operator”, in the “Iron & Steel” Sector/Industry and aims at building the following key competencies amongst the learner.

| | | | |
|--|--|----------------------------|------------|
| Program Name | Iron & Steel - Excavator Operator | | |
| Qualification Pack Name & Reference ID. | Iron & Steel - Excavator Operator ISC/Q0404 | | |
| Version No. | 1.0 | Version Update Date | 30-12-2014 |
| Pre-requisites to Training | Minimum qualification – Class X / literate with 3 years of experience Driving license mandatory | | |
| Training Outcomes | After completing this programme, participants will be able to: <ul style="list-style-type: none">• Prepare excavator for operations• Perform excavator Operations• Perform basic maintenance and troubleshooting on excavator• Carry out reporting and logging• Health and Safety | | |

This course encompasses 5 out of 5 National Occupational Standards (NOS) of “Iron & Steel - Excavator Operator” Qualification Pack issued by “Indian Iron & Steel Sector Skill Council”.

| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|----------------|---|--|---|
| 1 | Over view of Iron & Steel Industry Theory Duration (hh:mm) 04:00 Practical Duration (hh:mm) 00:00 Corresponding NOS Code | <ul style="list-style-type: none">• Understanding Iron & steel industry• Understanding types of Iron & Steel Industry• Understanding products of Iron & Steel industry• Activities in Iron & Steel Industry | PPTs of Iron and steel manufacturing, Charts showing the same |
| 2 | Occupational, Health and Safety (OHAS) Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 12:00 | <ul style="list-style-type: none">• Understanding the Occupational health & Safety• Understand What is hazard• Documentation for Health and safety• Working at Heights, confined spaces• Remedies for fire at work place | PPTs for OHAS related to Job Role, Display Material for PPEs related to Job Role, Safety Material |



| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|---|---|---|
| | Corresponding NOS Code ISC/N0008 | | |
| 3 | 5S & House keeping Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 16:00 Corresponding NOS Code ISC/N0004 | <ul style="list-style-type: none"> • Identification of bottlenecks in functioning of work place • Various methods of housekeeping both pre-work & post-work as well | PPTs of 5S, Display Charts of 5S, Audit Checklists of 5S |
| 4 | Prepare Excavator for operations Theory Duration (hh:mm) 24:00 Practical Duration (hh:mm) 70:00 Corresponding NOS Code ISC/N0411 | <ul style="list-style-type: none"> • Conducting pre-operation checks to ensure the Excavator is safe to use. • Recording details of checking and maintenance | PPTs for various types of drawings, Blue prints, & samples for controls, gauges, warning lamp and other safety devices, various measuring instruments |
| 5 | Perform excavator operations Duration (hh:mm) 30:00 Practical Duration (hh:mm) 75:00 Corresponding NOS Code ISC/N0412 | <ul style="list-style-type: none"> • Starting and driving the Excavator safely to the operations area • Loading and hauling the load to the designated destination • Discharging the load in correct way by tipping the dump with careful maneuvering of hoist lever | Precision measuring tools, pullers, controls, gauges, warning lamp and other safety devices |
| 6 | Performing routine maintenance and troubleshooting Theory Duration (hh:mm) 35:00 Practical Duration (hh:mm) 110:00 | <ul style="list-style-type: none"> • Routine maintenance in accordance with the manufacturer's recommendations and company procedures • Basic diagnostics and Troubleshooting | PPTs for various types of drawings, Blue prints, & samples for controls, gauges, warning lamp and other safety devices, various measuring instruments |



| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|---|---|---|
| | Corresponding NOS Code ISC/N0413 | | |
| 7 | Carry out reporting and logging Duration (hh:mm) 12:00 Practical Duration (hh:mm) 15:00 Corresponding NOS Code ISC/N0414 | <ul style="list-style-type: none"> Reporting of problem/incidents Reporting and Documentation | Sample Accident reports |
| 8 | Health and safety Duration (hh:mm) 12:00 Practical Duration (hh:mm) 15:00 Corresponding NOS Code ISC/N0434 | <ul style="list-style-type: none"> Health and safety procedures Fire safety procedures Emergencies, rescue and first aid procedures Health and safety measures critical for workers in a steel plant | PPE, Different Type of Safety Sign, First Aid Box, Safety instrument and clothing, Step Ladder, Sample Accident reports, Fire Extinguishers, Items required for fire extinguisher and fire Safety |
| | Total Duration Theory Duration 133:00 Practical Duration 313:00 | Unique Equipment Required: <ul style="list-style-type: none"> Mechanical Drawings, Blueprints Basic Tools and Equipment's measuring tools & precision measurement tools Assembling tools Material and Equipment for cleaning, lifting machines PPE, Safety Sign, First Aid Box, Fire Extinguishers | |

Grand Total Course Duration: **446Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Indian Iron and Steel Sector Skills Council](#))



Trainer Prerequisites for Job role: “Iron & Steel - Excavator Operator” mapped to Qualification Pack: “ISC/Q0404”

| Sr. No. | Area | Details |
|---------|---|--|
| 1 | Description | To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ISC/Q0404”. |
| 2 | Personal Attributes | Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field. |
| 3 | Minimum Educational Qualifications | Min. ITI Fitter pass and preferably CTI/ATI cleared/ Diploma Mechanical |
| 4a | Domain Certification | Certified for Job Role: “Iron & Steel - Excavator Operator” mapped to QP: “ISC/Q0404”. Minimum accepted score is 80% |
| 4b | Platform Certification | Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “SSC/1402”. Minimum accepted score is 80% |
| 5 | Experience | Min. 5 years industry experience and minimum 2 years’ experience as Trained or un trained for same Job Role/ Trade |



Annexure: Assessment Criteria

| | |
|-----------------------------|---|
| Assessment Criteria | |
| Job Role | Iron & Steel - Excavator Operator |
| Qualification Pack | ISC/Q0404 |
| Sector Skill Council | Indian Iron & Steel Sector Skill Council |

| Sr. No. | Guidelines for Assessment |
|---------|---|
| 1 | Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC. |
| 2 | The assessment for the theory part will be based on knowledge bank of questions created by the SSC |
| 3 | Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below) |
| 4 | Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on these criteria. |
| 5 | To pass the Qualification Pack, every trainee should score a minimum of 60% in every NOS. |
| 6 | In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack. |

| Assessment outcome (nos) | Assessment criteria | Total marks | Out of | Marks allocation | |
|--|---|-------------|-----------|------------------|------------------|
| | | | | Theory | Skills practical |
| ISC/N0411: Prepare Excavator for operations | PC1. Adhere to time limits given by supervisor | 250 | 5 | 0 | 5 |
| | PC2. Check oil levels of engine, transmission, radiator coolant and brake | | 15 | 5 | 10 |
| | PC3. Check differential and hydraulic oil levels | | 20 | 5 | 15 |
| | PC4. Check the hydraulic hose and ram for leakages | | 20 | 5 | 15 |
| | PC5. Check condition of parking brake, main horn, reverse horn, and head light. | | 20 | 5 | 15 |
| | PC6. Check the various controls, gauges, warning lamp and other safety devices | | 15 | 5 | 10 |
| | PC7. Check fan belt tension, electrolyte level and terminal tightness | | 15 | 5 | 10 |



| Assessment outcome (nos) | Assessment criteria | Total marks | Out of | Marks allocation | |
|--|---|--------------|------------|------------------|------------------|
| | | | | Theory | Skills practical |
| | PC8. Check and adjust driving position, rear and side mirrors, seat belts | | 15 | 5 | 10 |
| | PC9. Clean air filter dust bowls | | 15 | 5 | 10 |
| | PC10. Drain water and sediment from the fuel tank | | 15 | 5 | 10 |
| | PC11. Top up coolant and oil in engine, transmission, etc. if necessary | | 15 | 5 | 10 |
| | PC12. Apply grease to all greasing pins and pivot points | | 15 | 5 | 10 |
| | PC13. Ensure the locking bar is in position to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only) | | 15 | 5 | 10 |
| | PC14. Keep footplates and steps clean and free from mud, dirt and oil | | 5 | 0 | 5 |
| | PC15. Check rocker unit function, mole point and bucket replacement | | 15 | 5 | 10 |
| | PC16. Maintain a checking/maintenance logbook to record all activities performed before starting the Excavator | | 15 | 5 | 10 |
| | PC17. Report defects precisely to the supervisor if beyond scope of his role | | 15 | 5 | 10 |
| | NOS Total Marks | Total | 250 | 75 | 175 |
| ISC/N0412: Perform excavator operations | PC1. Plan and organize the job according to given instructions | 300 | 15 | 5 | 10 |
| | PC2. Inspect the worksite to identify any loose soil, hidden deep trenches or marshy patches where Excavator could get stuck. | | 20 | 5 | 15 |



| Assessment outcome (nos) | Assessment criteria | Total marks | Out of | Marks allocation | |
|--------------------------|---|-------------|--------|------------------|------------------|
| | | | | Theory | Skills practical |
| | PC3. Start the engine using the pushbutton switch and key switch together | | 15 | 5 | 10 |
| | PC4. Use the priming pump and pre-heater to start the engine in cold weather conditions | | 15 | 5 | 10 |
| | PC5. Operate the shifting quadrant device for selecting the correct gear range | | 20 | 5 | 15 |
| | PC6. Ensure Excavator load and operating speed is within limits specified by the manufacturer | | 15 | 5 | 10 |
| | PC7. Look out for people working and hazards such as trenches, potholes and cables | | 20 | 5 | 15 |
| | PC8. Adhere to time limits given by supervisor | | 10 | 0 | 10 |
| | PC9. Perform in-operation visual checks on critical temperature and pressure gauges. | | 20 | 5 | 15 |
| | PC10. Select and use the right type of brake in different situations and conditions. | | 20 | 5 | 15 |
| | PC11. Ensure that walkway rules e.g. operating the Excavator within the permissible/allocated areas are followed | | 15 | 5 | 10 |
| | PC12. Utilize judiciously various signalling devices available in the Excavator such as turn signal, parking indicator, air horn etc. | | 20 | 5 | 15 |
| | PC13. Keep a safe distance from a tip edge and use an approved stop block before tipping over an edge | | 20 | 5 | 15 |



| Assessment outcome (nos) | Assessment criteria | Total marks | Out of | Marks allocation | |
|--|--|--------------|------------|------------------|------------------|
| | | | | Theory | Skills practical |
| | PC14. Keep a safe distance from other plant or vehicles | | 10 | 0 | 10 |
| | PC15. Ensure that Excavator is always parked on firm, level ground; with handbrake applied and drive and controls disengaged | | 15 | 5 | 10 |
| | PC16. Operate the body hoist control handle to maneuver the hydraulic ram that tips the dump. | | 20 | 5 | 15 |
| | PC17. Discharge the load safely at the position and in the manner designated by the supervisor | | 15 | 5 | 10 |
| | PC18. Ensure that no other operators travel on or stand near the Excavator | | 10 | 0 | 10 |
| | PC19. Inform supervisor of any problems while operating the Excavator | | 5 | 0 | 5 |
| | NOS Total Marks | Total | 300 | 75 | 225 |
| ISC/N0413: Performing routine maintenance and troubleshooting | PC1. Track machine operating hours to assess the right service schedule. | 200 | 10 | 5 | 5 |
| | PC2. Clean air filter dust bowls | | 5 | 0 | 5 |
| | PC3. Clean footplates, pedals and steps free from mud, dirt, ice and snow | | 10 | 5 | 5 |
| | PC4. Drain water and sediment /fuel separators | | 5 | 0 | 5 |
| | PC5. Replenish coolants, lubricants and fluids | | 10 | 5 | 5 |



| Assessment outcome (nos) | Assessment criteria | Total marks | Out of | Marks allocation | |
|--------------------------|---|-------------|--------|------------------|------------------|
| | | | | Theory | Skills practical |
| | PC6. Grease all greasing pins and pivot points | | 15 | 5 | 10 |
| | PC7. Check battery levels and condition of the terminals and carrying out minor adjustments if required | | 15 | 5 | 10 |
| | PC8. Check and maintain the tyre rims, air pressure, wheel nuts and treads | | 15 | 5 | 10 |
| | PC9. Complete timely and legibly daily/weekly maintenance sheets as provided by the company | | 5 | 0 | 5 |
| | PC10. Ensure the machine is on firm and level ground before attempting to carry out any maintenance; track machine operating hours to assess the right service schedule | | 10 | 5 | 5 |
| | PC11. Clean air filter dust bowls | | 10 | 5 | 5 |
| | PC12. Clean footplates, pedals and steps free from mud, dirt, ice and snow | | 10 | 5 | 5 |
| | PC13. Drain water and sediment /fuel separators | | 5 | 0 | 5 |
| | PC14. Replenish coolants, lubricants and fluids | | 5 | 0 | 5 |
| | PC15. Grease all greasing pins and pivot points | | 5 | 0 | 5 |
| | PC16. Check battery levels and condition of the terminals and carrying out minor adjustments if required | | 5 | 0 | 5 |



| Assessment outcome (nos) | Assessment criteria | Total marks | Out of | Marks allocation | |
|---|---|--------------|------------|------------------|------------------|
| | | | | Theory | Skills practical |
| | PC17. Check and maintain the tyre rims, air pressure, wheel nuts and treads | | 5 | 0 | 5 |
| | PC18. Complete timely and legibly daily/weekly maintenance sheets as provided by the company | | 5 | 0 | 5 |
| | PC19. Ensure the locking bar is in position to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only) | | 10 | 5 | 5 |
| | PC20. Ensure that suitable props/support devices are used and the bucket is not raised while performing maintenance | | 10 | 5 | 5 |
| | PC21. Ensure that no maintenance task on the engine is performed when running or still hot | | 10 | 5 | 5 |
| | PC22. Assess when the problem is beyond his competence and report the problem to suitably qualified and competent personnel | | 10 | 5 | 5 |
| | PC23. Complete timely and legibly daily/weekly defect sheets | | 10 | 5 | 5 |
| | NOS Total Marks | Total | 200 | 70 | 130 |
| ISC/N0414: Carry out reporting and logging | PC1. Report problems/incidents as applicable in a timely manner | 100 | 15 | 5 | 10 |
| | PC2. Report to the appropriate authority as laid down by the employer | | 15 | 5 | 10 |
| | PC3. Follow reporting procedures as prescribed by the employer | | 10 | 5 | 5 |
| | PC4. Identify documentation to be completed relating to one's role | | 15 | 5 | 10 |
| | PC5. Record details accurately using the | | 15 | 5 | 10 |



| Assessment outcome (nos) | Assessment criteria | Total marks | Out of | Marks allocation | |
|-------------------------------------|---|--------------|------------|------------------|------------------|
| | | | | Theory | Skills practical |
| | appropriate format | | | | |
| | PC6. Complete all documentation within stipulated time. | | 15 | 5 | 10 |
| | PC7. Ensure documents are available to appropriate authorities to inspect | | 15 | 5 | 10 |
| | NOS Total Marks | Total | 100 | 35 | 65 |
| ISC/N0434: Health and safety | PC1. Perform storage and transport of hazardous materials compliant with safety guidelines | 150 | 20 | 5 | 15 |
| | PC2. Deal with misfires as per statutory requirement | | 15 | 5 | 10 |
| | PC3. Comply with safety regulations and procedures in case of fire hazard and refueling | | 20 | 5 | 15 |
| | PC4. Operate various grades of fire extinguishers | | 20 | 5 | 15 |
| | PC5. Work responsibly and as safe and careful as possible so as not to put the health and safety of self or others at risk, including members of the public | | 20 | 5 | 15 |
| | PC6. Emergency organisation of the specific work site. | | 20 | 5 | 15 |
| | PC7. Identify characteristics of liquid metal, liquid slag, fumes, gas pipelines, etc. and take necessary precautions | | 20 | 10 | 10 |
| | PC8. Wears safety gear such as hard hat, | | 15 | 5 | 10 |



| Assessment outcome (nos) | Assessment criteria | | | Marks allocation | |
|--------------------------|--|--------------|-------------|------------------|------------------|
| | | Total marks | Out of | Theory | Skills practical |
| | respiratory protection, eye protection, ear protection | | | | |
| | NOS Total Marks | Total | 150 | 45 | 105 |
| | Grand Total | 1000 | 1000 | 300 | 700 |
| | Percentage Weightage: | | | 50% | 50% |
| | Minimum Pass% to qualify (aggregate): | | | 60% | |