



APPENDIX A

ELEVATOR SERVICER AND REPAIRER

D.O.T. CODE 825.281-030

O*NET CODE 47-4021.00

This training outline is the current standard for Work Processes and Related Instruction. Changes in technology, regulations, and safety/health issues may result in the need for additional on-the-job or classroom learning.

WORK PROCESSES (On-the-Job Learning)

	<u>Approximate Hours</u>
A. <u>Use and Care of Tools</u>	250
1. Safety in the use of tools and equipment	
2. Proper care and use of hand tools and measuring devices	
3. Proper care and operation of power tools	
4. Proper care and use of testing equipment	
B. <u>Rigging and Material Handling</u>	800
1. Safety in rigging and material handling	
2. Lifting, carrying, pulling and/or pushing material/equipment – manually or by using rollers or dollies	
3. Verifying materials received at jobsite against the materials list and checking the condition of materials received	
4. Proper use of ladders, scaffolds, and working platforms	
5. Proper use of hoists, cable slings and chain falls	
6. Determining the appropriate rigging and hoisting	

	equipment, and the method necessary, based on load and rise	
	7. Determining the proper layout and location of material and equipment received at jobsite or at company's shop	
C.	<u>Shop Work</u>	300
	1. Preparation of records and job tickets	
	2. Proper method of cleaning, greasing, and oiling of elevator equipment and parts	
	3. Inspection of rigging and hoisting equipment for wear, damage and/or defects	
	4. Gathering and preparing of materials and equipment to be delivered to the jobsite	
D.	<u>Repair Work</u>	1,250
	1. Preparation of sketches in the field on repair work to be done and the order in which work is to be performed	
	2. Motor repair: geared and gearless	
	3. Gear and worm repair	
	4. Cam repair	
	5. Car repair	
	6. Door repair	
	7. Hydraulic pump repair	
	8. Repairing controls, including solid state	
	9. Repairing and adjusting governor	
	10. Brakes and safety device repair	
	11. Bearing identification and replacement	
	12. Oil and gland seals for traction and hydraulic	
	13. Repairing roller and guide shoe assemblies	
	14. Repairing drive sheaves	
	15. Repairing hoist ropes	
	16. Removing and replacing worn or broken parts including, but not limited to, those noted above	
	17. Completing all required service reports	
E.	<u>Estimating</u>	250
	1. Preparation of accurate time, labor and material estimates for service/maintenance work, repair	

work, conversion of old elevators, and
installation of new elevators and/or equipment

F. Inspection and Maintenance 1,250

1. Demonstrating knowledge of American National Standards Institute (ANSI) codes or applicable local codes
2. Painting, cleaning, oiling and greasing equipment
3. Cleaning and adjusting system components: motors; generator; doors and locks; hardware; signal and lighting circuits
4. Inspecting, servicing and adjusting other mechanical and/or electrical equipment
5. Inspecting and adjusting microprocessor
6. Inspecting sheaves and drums
7. Inspecting cables and hydraulic pumps
8. Inspecting and adjusting car
9. Inspecting and adjusting worms and gears
10. Troubleshooting and diagnosing causes of malfunctions, utilizing customer complaints as one source of information
11. Fine-tuning system to meet operational parameters and code requirements
12. Making manual adjustments to prints and wiring diagrams, when required
13. Inspecting and maintaining lighting in pit, motor room and top of car; inspecting and maintaining intercom, alarm bells, and phones
14. Labeling main line, motor controller, governor, transformer, generator, buffers, choke, etc.
15. Following all applicable inspection and testing requirements
16. Completing all required reports

G. Timing and Adjustment 750

1. Doors and gates
2. Speed and braking regulation
3. Safety operating devices
4. Fine-tuning system to meet specifications and codes
5. Balancing load of counterweight

H. Electrical Work 1,250

1. Rewiring, adjusting and reconnecting contacts on central/control boards
2. Rewiring switches, governors and other regulating devices
3. Installing and wiring automatic door opening and leveling devices
4. Installing overlays, upgrading or installing new fire service and/or installation of SCR drives on motor generators

I. Installation of New Parts and Equipment 1,400

1. Removal of all old equipment
2. Installation layout, and equipment organization/sequencing
3. Installation of electrical devices at primary control panel and on individual floors
4. Installation and assembly of elevator car
5. Installation of guide shoes and rollers
6. Installation of cams
7. Installation of winches, hydraulic cylinder and pump, motors, and plunger foundations
8. Installation of hoist and governor ropes
9. Hanging of lights and signal cables
10. Installation of limit switches, rope gripper, pit lights and outlets, intercoms, etc.
11. Installation of counterweight, car frame, cable guards, comp-ropes, chains, whisper flex, etc.
12. Altering existing printed circuit boards for changes and updates
13. Modification and/or installation of solid state controls and programming of microprocessors to meet new specifications and codes
14. Installation of security systems
15. Installation of lobby stations
16. Inspection and adjustment of components and entire system to meet specifications and ANSI standards or applicable local codes
17. Completing all required reports

J.	<u>Related Systems: Installation of New or Replacement Parts/Equipment, Service/Maintenance and Repair</u>	500
	<ul style="list-style-type: none"> 2. Demonstrating a knowledge of ANSI codes or applicable local codes 3. Escalators, powered walkways/people movers 4. Handicap lifts 5. Dumbwaiters 6. Material lifts 7. Stair lifts 8. Theater/stage lifts 9. Residential elevator equipment 	
	TOTAL HOURS	8,000

Apprenticeship work processes are applicable only to training curricula for apprentices in approved programs. Apprenticeship work processes have no impact on classification determinations under Article 8 or 9 of the Labor Law. For guidance regarding classification for purposes of Article 8 or 9 of the Labor Law, please refer to <http://www.labor.state.ny.us/workerprotection/publicwork/PDFs/Article8FAQS.pdf>.

APPENDIX B

ELEVATOR SERVICER & REPAIRER

RELATED INSTRUCTION

Safety and Health

OSHA 10-hour Construction Course – if required for Public Work
Trade Safety (including, but not limited to: Personal Protective Equipment, Lock-out/Tag-out, Avoiding Electric Shock, Fall Protection, Ladder Safety, Scaffold Safety, Proper Lifting Techniques, Confined Space Safety)
Drug and Alcohol Awareness
Right-to-Know/Material Safety Data Sheets (MSDS)
Asbestos Awareness – minimum 4 hours (see attachment)
First Aid – minimum 6.5 hours every 3 years

Blueprints

Fundamentals of Blueprint Reading and Sketching
Blueprint Reading for Elevator Installers and Repairers
Specifications, Symbols, Date, etc.
Blueprint Reading for Electrical Devices

Mathematics

Fundamentals
Applications to Machines
Applications to Electricity
Applications to Cable Rigging

Trade Theory and Science

History of the Industry
Tools and Equipment: Operation, Care and Maintenance
Terminology of the Trade
Materials of the Trade
Principles of A.C. and D.C.
Reading and Understanding Local, State and National Electrical Codes
Construction Wiring Installation
Physics as Applied to the Elevator Industry

Principles of Motors, Generators, SCR Drives, VVVF Drives
Permanent Magnet Motors
Hydraulics
Fundamentals of Electronics
Fundamentals of Automatic Controls and Safety Devices
Fundamentals of Solid State Controls
Basic Programming for Microprocessors
Elevator Doors and Equipment
Modernization of Elevator Systems
Rigging and Hoisting
Troubleshooting
Residential Elevators
Specialty Tools and Equipment
New Technologies
Preparation for Licensing Exam (at option of sponsor)
Preparation for Certified Elevator Technician Exam (at option of sponsor)

Other Workplace Skills

Introduction to the Personal Computer and Trade-Related Software (if applicable)
Customer Relations and Personal Service
Industrial History and Labor Relations (20 hours)
 History and Background (6 hours, 1st year)
 Current Laws and Practices (14 hours, 2nd year)
Sexual Harassment Prevention Training – minimum 3 hours

Other Related Courses as Required

A minimum of 144 hours of Related Instruction is required for each apprentice for each year.

ATTACHMENT TO APPENDIX B

Asbestos Awareness

This course must be delivered by one of the following:

1. A provider currently approved by the New York State Department of Health to deliver asbestos safety training.
2. A person holding a current Asbestos Handler certificate from the New York State Department of Labor in the title of: Inspector, Supervisor, Project Monitor, Management Planner, or Project Designer.
3. Anyone otherwise approved by the New York State Education Department.

Minimum course contents must include the following:

1. Definition of asbestos
2. Types and physical characteristics
3. Uses and applications
4. Health effects:
 - Asbestos-related diseases
 - Risks to families
 - Cigarette smoking
 - Lack of safe exposure level
5. Employer-specific procedures to follow in case of potential exposure, including making a supervisor or building owner immediately aware of any suspected incidental asbestos disturbance so that proper containment and abatement procedures can be initiated promptly.

Notwithstanding the above course requirement, employers are advised that they must also be in compliance with New York State Department of Labor Industrial Code Rule 56 at all times.

Employers are further advised, and must advise all apprentices, that completion of the above course requirement does not authorize any person to remove, encapsulate, enclose, repair, disturb, or abate in any manner, any friable or non-friable asbestos, asbestos containing material, presumed asbestos containing material, or suspect miscellaneous asbestos containing material.