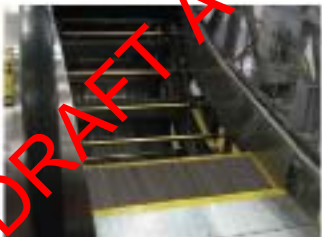




# Escalator Handrail Installation and Maintenance

## Course 211

Transit Elevator/Escalator Maintenance Training Consortium



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# Escalator: Handrail Installation and Maintenance

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## Participant Guide

Transit Elevator/Escalator Maintenance Training Consortium

COURSE 211

## REVISION INDEX

Any additions, deletions, or revisions are to be listed below.

Revision No.	Date	Section	Description of Change	Revision Author
1	10-05-2015		Final edits of 03-12-2012 version	Transportation Learning Center - Amri Joyner

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## HOW TO USE THE PARTICIPANT GUIDE

### Purpose of the Course

The purpose of the *Escalator: Handrail Installation and Maintenance Course* is to assist the participant in demonstrating proper safety procedures and a working knowledge of the functions of various escalator handrail components, controls, and assemblies.

### Approach of the Book

Each course module begins with an outline, a statement of purpose and objectives, and a list of key terms. The *outline* will discuss the main topics to be addressed in the module. A list of *key terms* identifies important terminology that will be introduced in this module. *Learning objectives* define the basic skills, knowledge, and abilities course participants should be able to demonstrate to show that they have learned the material presented in the module. A list of *key terms* identifies important terminology that will be introduced in each course module. *Review exercises* conclude each module to assist the participants in reviewing key information.

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# Module 1

## GENERAL SAFETY PROCEDURES

### OUTLINE

- 1-1 Review of 200 and 208
- 1-2 Escalators and Moving Walks
- 1-3 Barricades
- 1-4 PPE for Step Removal/Replacement
- 1-5 Local Safety Practices for Working Inside Equipment
- 1-6 Local Safety Practices for Barricades and Signage
- 1-7 Summary

### PURPOSE AND OBJECTIVES

The purpose of this module is to provide an overview for the apprentice with a conceptual understanding of escalator step installation and maintenance safety practices.

Following the completion of this module, the participant should be able to complete the objectives with an accuracy of 75% or greater:

- Identify general safety practices
- Relate safe work practice to escalator maintenance

### KEY TERMS

- ASME A17.1 (Code Book)
- Elevator Industry Employees' Field Safety Handbook
- Personal Protective Equipment (PPE)
- Related Agency Standard Operating Procedures (SOP) and Maintenance Practices
- Transit Agency Safety Handbook

## 2-8 TYPES OF HANDRAIL DRIVE SYSTEMS

The handrail is driven by friction sheaves mounted on a shaft. This shaft is driven by either a chain (conventional), gear (gear-driven), or belt (belt-driven). The handrail will move at the same speed as the steps. Friction wheels may have various materials attached to the wheels to increase friction. The handrail is held against the friction wheel by an adjustable spring-loaded holding fixture. Pressure between the handrail and friction wheel is set by adjusting the compression of the loaded springs.

### Conventional - Chain Drive

A Conventional handrail drive system can be one of two types. The direct drive system is a chain driven directly by a main handrail chain. An indirect drive system is driven off a drive system which is driven off the main shaft for the step chain system. (A sprocket on the main drive shaft drives a countershaft. The countershaft then drives the left and right side handrail chains. Sprockets are used to adjust the tension by removing slack on the chains.)

### Handrail Transmission - Gear Driven (O&K ONLY)

The drive system is a gear system, which connects to the main drive shaft from the motor to the handrail drive shaft.

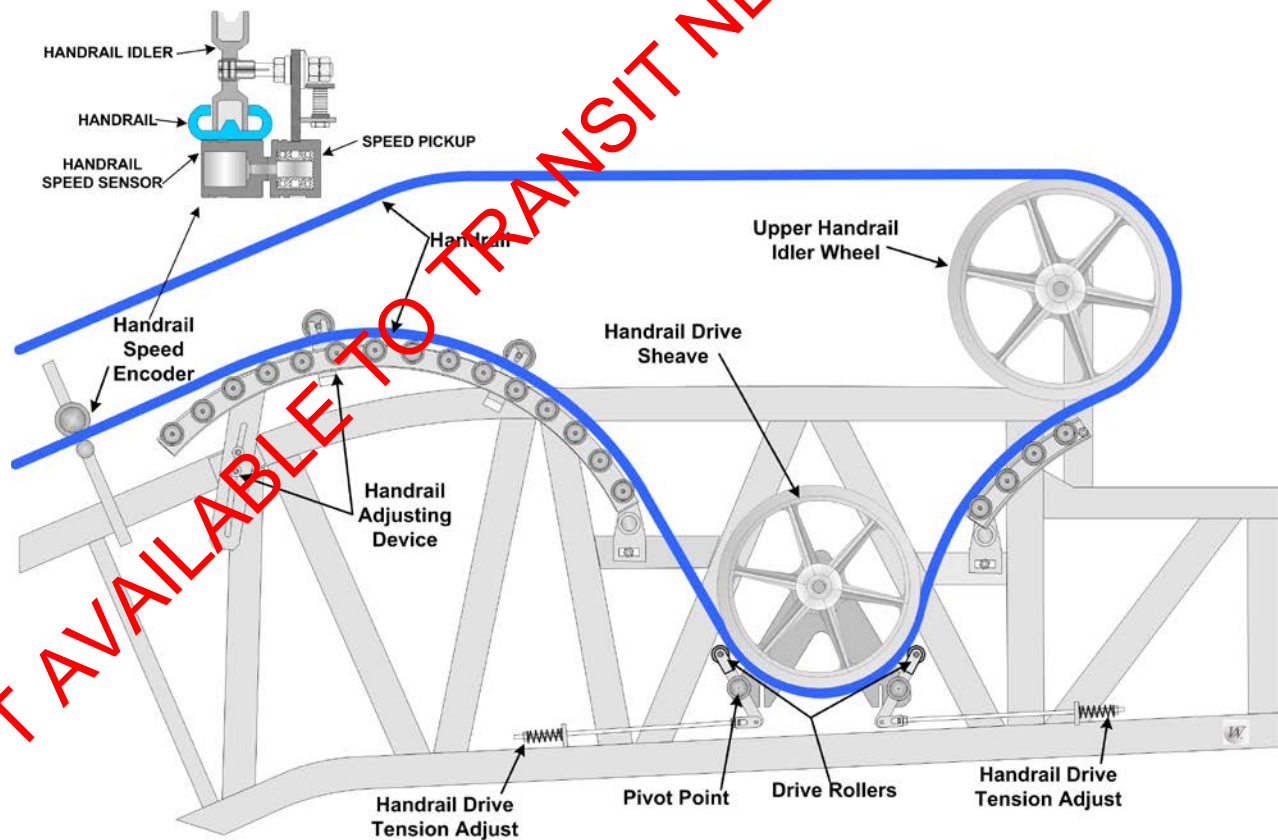


Figure 2.15 Handrail Transmission

ESCALATOR-SPECIFIC: HANDRAIL INSTALLATION AND MAINTENANCE  
MODULE 3: HANDRAIL AND HANDRAIL DRIVE REMOVAL AND REPLACEMENT

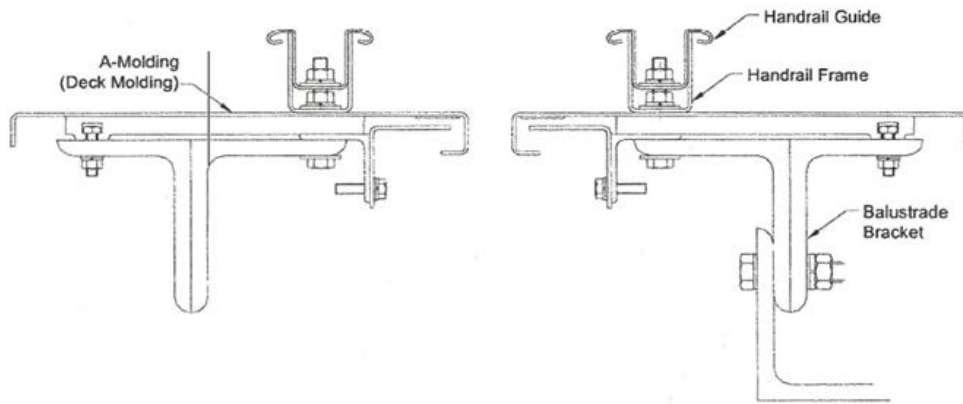


Figure 3.18 Handrail Guides

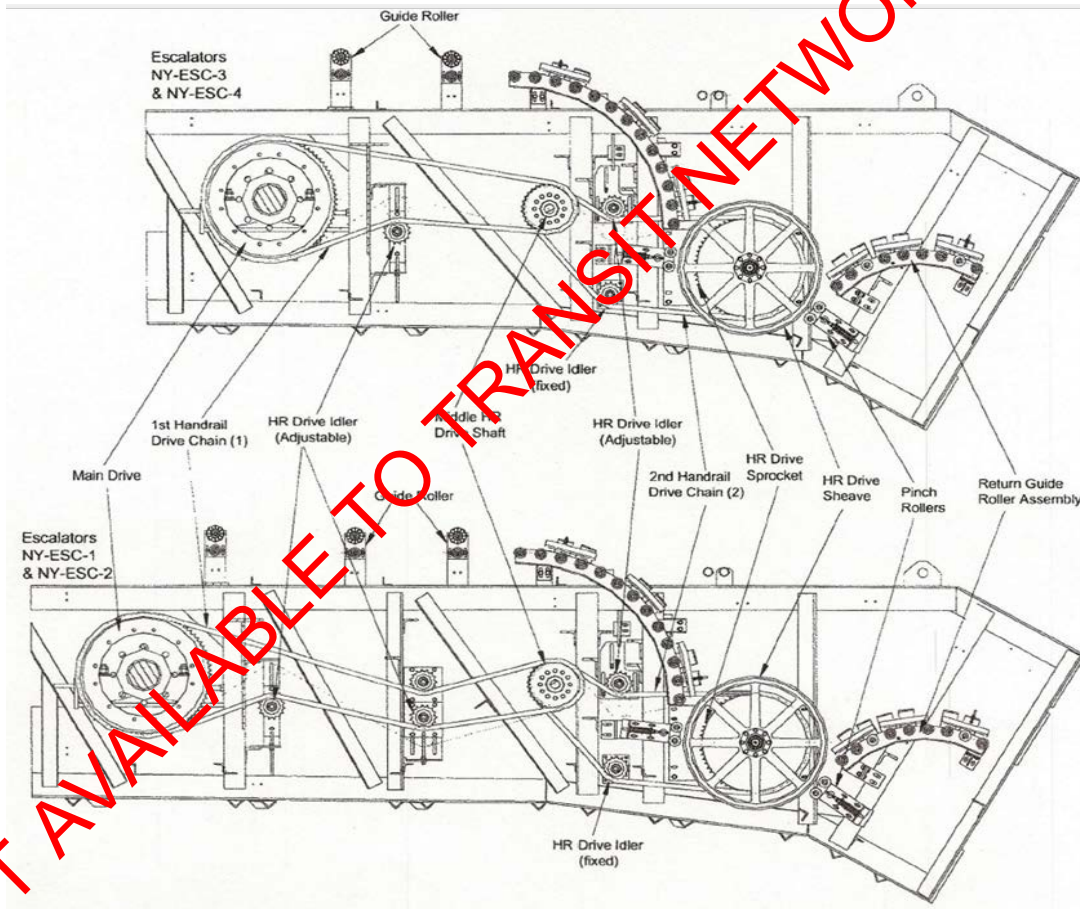


Figure 3.19 Fujitec Handrail Guides

## Westinghouse Handrail Drive System Adjustment

### Drive Chain and Sprocket Reference

1. The drive chain idler assembly is used to take the slack out of the drive chain. DO NOT OVER - TIGHTEN THE DRIVE CHAIN OR EXCESSIVE SPROCKET WEAR, CHAIN STRETCH AND HANDRAIL JERKING WILL RESULT. The ideal tension is achieved with a total deflection of 1" measured midway between the idler and main sprocket on the handrail drive.

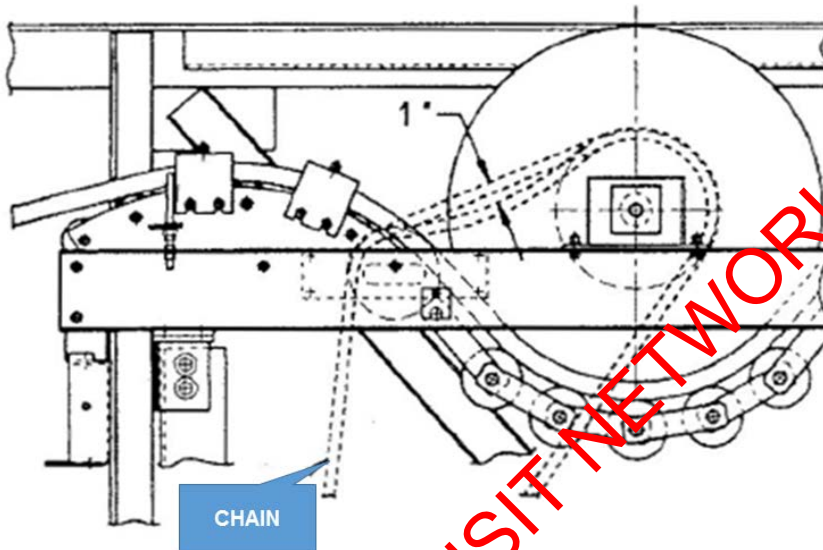


Figure 3.20 One-Inch Deflection

- a. Chain inspection: **Caution** – Never shorten the chain and never replace the sprockets without replacing the chain. When it is necessary to replace a sprocket, the sprockets must be replaced as a set.
  - b. If the chain rides up on the drive sprocket and the sprockets do not appear to be worn, or if all the adjustment is used up in the idler assembly, replace the chain.
  - c. The initial length of the chain, including the master link, is 95-1/4" long. When the chain stretches to 96-3/4", it should be replaced.
2. Sprocket inspection:
    - a. If the tooth profile begins to form a "hooked" shape, replace the sprockets and chain.
    - b. If the wear on the sprockets is non-symmetrical, check alignment.
    - c. If the sprocket tips show wear, replace the chain.
  3. When replacing sprockets, the output sprocket on the gear reducer **MUST** be plumb with the handrail drive sprocket. The outside surface of the handrail drive sprocket must be located 5/8" from the inside surface of the (outer) handrail drive frame. (This dimension centers the idler in the center of its float.)