AORSI-200-LSCM Workbook

Overview

This course teaches safe methods for transporting gear, tools, and supplies in off-road vehicles and trailers. It emphasizes proper loading, balance, and securement to prevent accidents and ensure efficient operations in demanding environments.

Learning Objectives

- Understand weight limits, balance, and center of gravity.
- Apply safe tie-down techniques and cargo securement standards.
- Recognize how improper loading affects handling and safety.
- Safely load and transport trailers in off-road settings.

Module 1: Load Ratings, Vehicle Capacity, and Trailer Towing

Every vehicle has manufacturer-set weight ratings, including Gross Vehicle Weight Rating (GVWR), Gross Combined Weight Rating (GCWR), and towing capacity. Exceeding these ratings can cause mechanical failure, reduce braking effectiveness, or lead to rollovers. Students must understand how to calculate payload, account for passengers, gear, and trailers, and stay within safe limits.

Course Design Suggestion: Provide students with vehicle manuals and have them calculate maximum payload and towing limits for real-world scenarios.

Exercise: Calculate the payload capacity of a vehicle carrying four passengers, camping gear, and towing a small trailer.

Reflection Question: Why is it dangerous to exceed GVWR even if the vehicle appears to handle the load?

Module 2: Cargo Securement Devices & Standards (Straps, Nets, Anchors)

Safe cargo transport depends on using the correct securement devices. Straps, chains, nets, and anchor points must meet DOT and ANSI standards. Improperly secured cargo can shift during travel, leading to instability or loss of control. Students must learn to inspect tie-downs for wear, use appropriate working load limits, and follow best practices for securement angles and redundancy.

Course Design Suggestion: Create a hands-on lab where students inspect different tie-down devices and practice securing varied cargo types.

Exercise: List five common cargo securement errors and provide the correct prevention methods.

Reflection Question: Why is redundancy (multiple tie-downs) important when securing heavy cargo?

Module 3: Center of Gravity & Handling Impacts

The distribution of weight in vehicles and trailers directly affects handling. Loads placed too high raise the center of gravity, increasing rollover risk. Uneven distribution causes swaying or difficulty steering. Operators should learn techniques for lowering the center of gravity and balancing weight evenly. This module connects physics concepts with real-world safety practices.

Course Design Suggestion: Demonstrate with models how shifting cargo alters center of gravity. Use simulation tools or scaled trailers to show effects of imbalance.

Exercise: Diagram a properly balanced cargo load for an off-road vehicle roof rack and trailer.

Reflection Question: How does improper cargo distribution increase rollover risk in off-road terrain?

Module 4: Trailer Operations and Off-Road Hauling

Towing trailers in off-road conditions introduces challenges such as reduced maneuverability, braking strain, and terrain limitations. Operators must understand safe hitching, trailer brake systems, and how to adjust driving techniques for narrow trails, steep slopes, and soft ground. Special attention should be given to recovery scenarios where trailers become stuck or unstable.

Course Design Suggestion: Conduct a field drill where students practice hitching, maneuvering, and recovering a trailer in varied terrain.

Exercise: Create a pre-trip inspection checklist for an off-road trailer haul.

Reflection Question: What additional risks are present when towing trailers off-road compared to highway conditions?

Final Assessment

Task: Participate in a cargo securement drill where students safely load, balance, and secure gear in a vehicle and trailer. Perform a load safety inspection to verify compliance with securement standards. Additionally, complete a short written exam covering the following sample questions:

1. What is GVWR and why is it important for safe loading?

2. Name two DOT/ANSI securement standards that apply to tie-down devices.

3. How does an elevated center of gravity affect off-road handling?

4. List three safety checks before towing a trailer off-road.

5. Why is redundancy critical in cargo securement practices?

Duration: 5 hours (shop + field)