Chapter 4: Shoulders

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Suggested personal safety equipment

- Highly visible apparel

Advance preparations

- Be properly trained and familiar with equipment.
- Make sure an up-to-date first-aid kit, emergency contact information, and hand-held radios or cell phones are available at the work site.
- Be sure all work vehicles have approved and activated warning lights.

During operations

- Use temporary traffic control, including flagger(s) if needed, as described in the Iowa Traffic Control Devices and Pavement Markings: A Manual for Cities and Counties; in the MUTCD, part 6; and in your agency’s policies and procedures.
- Check sight distance for approaching traffic before starting work and adjust advance warning signs as needed.
- Wear highly visible apparel when out of your vehicle.
- Do not park vehicles and equipment on both sides of the roadway.
- Do not back equipment into traffic lanes without a spotter.
- Keep open roadway clear of loose aggregate and other debris.
- Do not leave edge drop-offs unprotected overnight.
- Remove all temporary traffic control immediately when no longer needed.
Shoulders are adjacent to the roadway and are considered an extension of the roadway. Shoulders serve several purposes. They

- Provide lateral support for the roadway.
- Expedite surface runoff from the roadway.
- Provide space for maintenance and construction equipment and activities.
- Provide a safe area for vehicles that accidentally leave the roadway and, in emergencies, accommodate slow-moving or stopped vehicles.
- Accommodate bicycles.

Shoulders may be the same material as the roadway but not necessarily. Shoulders are earth, granular, or paved with asphalt or concrete.

Note: Shoulders on minimum maintenance and granular surfaced roads are discussed in those sections in chapter 3.

**Characteristics of Well-Maintained Shoulders**

In general, a well-maintained shoulder is flush with the roadway driving surface (that is, it is not higher or lower than the adjacent roadway), slopes slightly away from the driving surface, and has no erosion problems. See figure 4–1.

Many agencies generally consider an edge drop-off (between the shoulder and driving surface) greater than two inches to be excessive. Consult your supervisor and follow your agency’s policy.

**Optimal Timing/Conditions for Maintenance**

As with the roadway itself, the optimal timing and conditions for maintaining shoulders depend on whether the shoulder is gravel, asphalt, or concrete. Consult the appropriate sections in chapter 3.
Shoulder Maintenance Issues

In general, shoulders experience the same maintenance issues, and require the same maintenance activities, as do roadways made of the same material. See chapter 3 for specific information about maintaining various roadway surfaces.

The following deficiencies are specific to shoulders:

- **Low shoulders, or shoulder (edge) drop-off.** See figure 4–2. Drop-offs create a safety hazard to drivers and allow water to penetrate into the subgrade. Drop-offs are among the top accident-related conditions and a common source for tort claims against agencies that maintain roadways.

Most edge drop-offs result from poor drainage, erosion of uncompacted shoulder materials (when the shoulder is earth or gravel), or settlement (when the shoulder is paved with asphalt or concrete).

- **High shoulders.** High shoulders create a safety hazard to drivers and restrict drainage away from the roadway. Earth shoulders that were originally flush with the adjacent roadway may, over time, become too high. Vegetation in the shoulder collects sediment and gradually breaks down, raising the level of the earth.

- **Erosion.** Shoulder erosion can cause (and may be caused by) poor drainage. Earth or gravel shoulders with steep slopes may be particularly prone to erosion.

- **Vegetation.** When vegetation is allowed to grow on earth shoulders, it can inhibit drainage, create secondary ditches, cause snow to drift, and create unsafe conditions for vehicles that leave the roadway.

- **Secondary ditches.** Secondary ditches can form in shoulders from excessive throw-off of material from gravel roads, when heavy vehicles travel near or on the shoulder, or when there is a lack of proper shoulder maintenance. Secondary ditches can cause many roadway problems that may result in the need to rebuild the roadway. See chapter 5.

- **Fixed-object improvements within the clear zone.** Such objects can be safety hazards.

![Figure 4–2. Shoulder edge drop-off](image-url)
Driveways provide access from the roadway to adjacent land uses. Be aware of the area where the driveway interconnects with the shoulder. Be careful that maintenance operations do not negatively impact adjacent property owners. Figure 4–3 shows the proper drainage point for a driveway.

**Shoulder Maintenance Activities**

**Repairing Edge Drop-Off, Erosion, and Secondary Ditches**

Refill, reshape, and compact earth and gravel shoulders in accordance with the original design (figure 4–4). Paved shoulders, either concrete or asphalt, will need to have a fillet placed next to the roadway where the edge drop is excessive. Asphalt is most commonly used material for this activity.

**Repairing High Shoulders**

Shoulders higher than the adjacent pavement should be reshaped and compacted. If vegetation in the shoulder is part of the problem, use a mechanical mixer to break up roots and follow with blading.

**Mowing**

Mow earth shoulders regularly. Consult your supervisor, and follow your agency’s policies and procedures.

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**Beware of Methamphetamine Trash**

Shoulder-mowing crews should be alert for abandoned materials from methamphetamine-manufacturing labs. These hazardous materials require special handling. Consult your supervisor, and follow your agency’s policy.

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**Figure 4–3. Drainage point for driveways**
Managing Obstacles in the Clear Zone

Agencies must manage fixed-object improvements (like fences, utility poles, or culvert headwalls) located on the shoulder and within the clear zone. The goal is to eliminate collision hazards. If you see fixed objects in the clear zone, notify your supervisor.

Figure 4–4. Repairing edge drop-off (LTAP-IN)
BIBLIOGRAPHY


