

### Introduction

When building Complete Streets, communities have a variety of options when it comes to pavement. Those options can be divided into traditional pavement types, such as asphalt or concrete, or into emerging new pavement types, such as permeable surfaces (see chapter 4.9 on Innovative practices). Pavement is a durable material laid down in an area that is going to sustain vehicular or foot traffic. Pavement comes in many different forms, such as asphalt, brick, or concrete. There are also environmentally friendly forms of pavement that are more commonly used in areas that have low-impact roadways and walkways. In general, when choosing the pavement type for an individual project, factors such as durability, safety, or sustainability are considered. The different types of pavement are discussed below.

### Traditional Pavement Types

#### Asphalt Road:

Asphalt is a sticky, black and highly viscous liquid or semi-solid that is present in most crude petroleum and in some natural deposits. Asphalt is primarily used as a sealant for rooftops and a durable surface for roads, airport runways, playgrounds, and parking lots. It consists of asphalt and mineral aggregate mixed together, then laid down in layers and compacted. Below are some advantages and disadvantages to using asphalt for street pavements.

Considerations of Asphalt: ([Asphalt Pavement Institute](#) and [The Civil Engineer Group](#))

- Dark pavement increases heat radiating from the surface on sunny days; this can make it uncomfortable for pedestrians to walk without proper shading.
- Relatively smooth finish helps with snow removal and reduces noise level.
- Cost effective as asphalt is quick to implement and dries fast, thus reducing the time to complete construction and having a road blocked to traffic.
- Recyclable material as asphalt can be used over and over again (also refer to Greenroads in Chapter 4.9).
- With new design strategies, improved performance of material and construction techniques, asphalt can be designed to last over 40 years.
- Causes weather pollution since melting asphalt produces a lot of harmful greenhouse gases.
- Asphalt can be less durable with heavy traffic that causes rutting.
- Because of the smooth finish, asphalt is good for bicyclist.
- Asphalt is not ideal for bus stops because of the heavy weight of the vehicle; concrete bus pads generally work best.



#### ◀ Asphalt Road

(Photo: MORPC, Columbus, OH)

- This picture shows an asphalt road with a crosswalk and sharrow markings in the lane.

### Rubberized Asphalt Road:

Rubberized asphalt is a pavement material that consists of regular asphalt concrete mixed with crumb rubber – ground, used tires that might otherwise be discarded. The advantages and disadvantages for using rubberized asphalt are discussed below ([Arizona DOT](#))

Considerations of Rubberized Asphalt: ([Clemson University](#))

- Improves resistance to cracking in pavement.
- Decreases noise levels because the rolling pressure of the tires reduces the frequency range that is heard.
- Environmentally friendly, especially since it keeps tires out of landfill.
- The material is temperature-sensitive and can therefore only be applied at certain times of the year depending on the location.
- Good pavement type for trails because of the surface is smooth.



◀ Rubberized Asphalt  
(Photo: Franklin County Engineers Office)

- Rubberized asphalt is being laid on a road in Franklin County, Ohio.



▲ Rubberized Asphalt  
(Photo: Franklin County Engineers Office)

- Using rubberized asphalt decreases the road noise levels for drivers.

# Chapter 4—Engineering

## 4.8 Pavement

### Concrete Roads and Sidewalks:

Concrete is a composite construction material composed of cement and other materials, such as fly ash, slag cement, aggregate, water, and chemical admixtures. Concrete is used to make pavements for roads, sidewalks, bridges/overpasses, parking structures, walls, and other architectural structures and foundations. Below are some advantages and disadvantages to using concrete for street pavements.

#### Considerations of Concrete: [\(The Civil Engineer Group\)](#)

- High durability as concrete has a long service life.
- Greener process as producing it is less polluting than asphalt.
- More resource sensitive as it does not use a petroleum byproduct.
- Paving cost of the concrete road is higher compared to asphalt paving.
- Higher maintenance costs as it can easily develop cracks.
- Concrete is great for pedestrians because it does not give off heat on warm sunny days.
- Concrete is good for sidewalks, but must be aware of tree roots cracking sidewalks.
- Concrete pads should always be used at bus stops as they can hold heavier vehicles.



#### ◀ Concrete Sidewalk

*(Photo: MORPC, Columbus, Ohio)*

- Small trees are planted along the concrete sidewalk to ensure shade for pedestrians, but also these trees have small roots and will not crack sidewalk.

### Low Volume Pavement Types

#### Chip Seal Road:

Chip seal combines asphalt with a layer of aggregate to create a pavement. Chip seals are used as a pavement maintenance practice and on rural roads that carry low traffic volume. Below are some advantages and disadvantages to using chip seal for street pavements.

#### Considerations of Chip seal: [\(Galehouse & Wood\)](#)

- Cheaper than asphalt paving, although not as long lasting.
- In hot weather, chip seals re-seal cracks by flowing back together.
- The rough wearing surface creates more roadway noise than does typical asphalt or concrete.
- Chips seal over time can produce flying chips that can result in a broken windshield or harm a bicyclist.
- Reduces ride quality (esp. for bicyclists) due to the uneven surface.



#### ◀ Chip Seal Road

*(Photo: Delaware County, Ohio)*

- Chip seal can be used on rural low traffic roads.

### Brick Roads

A brick is a block of ceramic material used in masonry construction, usually laid using various kinds of mortar. Brick pavement is incapable of withstanding heavy traffic, but is coming back into use as a method of traffic calming or as decorative surfaces in pedestrian precincts. Below are some advantages and disadvantages to using brick as road surfaces.

Considerations of Brick Roads: ([Fehr & Peers](#) and [FHWA](#))

- Overall longer life span than asphalt.
- Can be used as a traffic calming element in areas where slow speed is encouraged.
- Provides a nice design element to neighborhoods.
- Individual bricks become loose and uneven over time and need to be replaced.
- Cannot withstand heavy traffic.
- Tree roots can uplift breaks if the roots get too large.
- Loose and uplifted bricks can become stumbling blocks for pedestrians.
- Brick roads are less comfortable for bike riders.
- Brick roads are less safe for wheel chair users.



#### ◀ Brick Road

(Photo: MORPC, Columbus, OH)

- Brick is being used for both the road and the sidewalk.



#### ◀ Brick Road

(Photo: MORPC, New Albany, OH)

- Newly redesigned brick road with sidewalks to provide traffic calming and a nice design element.

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#### Gravel Roads

A gravel road is a type of unpaved road surface with gravel that has been brought to the site from a quarry or stream bed. Gravel roads are common in rural areas with low development. Below are some advantages and disadvantages of using gravel as a road surface.

Considerations of Gravel Roads: ([Dutchess Land Conservancy 1998](#))

- Less costly to construct than paved road because the material is cheaper.
- Easier to maintain as they require less equipment.
- Surface damage is less expensive and easier to correct.
- Gravel roads preserve the area's rural character.
- Require more frequent maintenance because over time the gravel becomes loose.
- Gravel roads generate dust.
- Can become impassable with frequent snow or rain as water tends to stand.
- Create greater wear and tear on vehicles than paved roads.
- Are not good for bicyclists because the gravel is uneven and uncomfortable to ride and can become loose over time.



▲ Gravel Road  
(Photo: Delaware County, Ohio)

- Gravel Roads are mainly used in rural counties.
- Gravel roads can help preserve the rural character of the area.

#### Sources

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