

### WHAT IS IT?

Concrete pavements have been a mainstay of America's infrastructure for more than 50 years. The country's first concrete street, built in Bellefontaine, Ohio, in 1891, is still in service today. Moreover, these long-lasting pavements are not confined to one region of North America, nor to a specific type of environment or climate. Concrete can handle the freezing winters of Michigan's Upper Peninsula to the scorching heat of the Southwest.

While concrete pavements are best known as the riding surface for interstate highways, concrete is a durable, economical, and sustainable solution for state highways, rural roadways, residential and city streets, intersections, airstrips, intermodal facilities, military bases, parking lots, and more.

Regardless of the type of roadway or current pavement conditions, there is a concrete solution. It can be used for new pavements, reconstruction, resurfacing, restoration or rehabilitation. Concrete pavements generally provide the longest life, least maintenance, and lowest life-cycle cost of all alternatives.

#### What's in it?

Concrete is a mix of some of the most abundant resources on earth – water, sand, aggregate, cement, and air. Equally important, these resources are typically available locally, reducing transportation costs and fuel consumption for delivery.

The key ingredient of concrete is portland cement, which gives the material its strength and binds the materials together.

Many concrete pavements also include supplementary cementitious materials. These may include industrial by-products like fly ash or blast furnace slag.

Modern concrete pavements are constructed with a system of joints that controls cracking and may provide for a specific aesthetic effect. Some of these pavements included steel at the joints to provide load transfer, keeping the pavement very smooth and quiet over its life.

#### When to use it?

Concrete is a solid choice for any pavement need. Basically, whenever a durable, cost-effective, low-maintenance choice is required, you can't go wrong with concrete. It can be used as a surface for:

- Mainline highways
- Residential streets
- Parking lots
- High volume streets and local roads
- Heavy industrial/intermodal/military facilities
- Airport runways, taxiways and aprons

#### Solutions Provided:

- **Long life** - Concrete pavements have an average service life of 30 to 50 years.
- **Low maintenance requirements and costs** - No need for repeated resurfacing, frequent spot repairs or patching.
- **Smoother traffic flow** - The construction of concrete pavements does not require lengthy lane closures.

## CONCRETE PAVEMENTS



- **Quick reopening** - Roads can be reopened in as short as 6 hours.
- **Low life-cycle cost** - Consumes minimal materials, energy, and other resources for construction, maintenance, and rehabilitation activities throughout its service life
- **Safety**
  - Less susceptible to the formation of heavy-vehicle wheel ruts
  - Easier to see at night
  - Ensures shorter vehicle stopping distances in wet weather
  - Due to longevity, there are fewer work zones over the life of the pavement

### Benefits:

- **Can incorporate industrial by-products**
  - Diverts waste from landfills
  - Some materials can enhance concrete properties such as improving workability, decreasing permeability, improving durability, and enhancing strength
  - Reduces embodied primary energy (~35%) and greenhouse gases (~45%)
- **Consumes less energy in the long run** - Fuel demand is lower to operate construction equipment.
  - Average fuel demand for building a concrete pavement: 1,916 gal vs. 10,718 gal for asphalt
  - Energy costs are ~33% less to illuminate concrete roadways
- **Uses fewer raw materials** - Requires less sub-base aggregate materials for structural support
- **Renewable and recyclable** - After its service life as a pavement, concrete can be crushed into aggregate for use in new concrete or as a sub-base material. The rebar can be recycled too.
- **Improves air quality** - Lighter-colored pavement reduces the urban heat island effect and smog.
  - Temperatures ~15°F lower than darker-colored pavements
- **Superior fuel efficiency** - Trucks travel along a more rigid pavement (reduced pavement deflection). This helps keep costs of consumer goods from escalation since one-fifth of the cost of a typical consumer item includes transportation expenses.
  - Average fuel savings per tractor trailer: 3.85% per year
  - Average fuel saved per tractor trailer: 700 gal per year



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