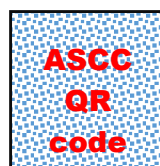


Concrete Parking Lots

A Quick Reference Guide



Scan for



additional resources



YOUR PARKING LOT IS A REFLECTION OF YOUR BUSINESS

Making the Right Impression . . .

Choosing concrete for your parking lot can have a dramatic effect on the first impression and perceived value of your products or services. A well designed concrete parking lot implies quality to your customers, tenants, and employees, before they even walk through the door. In today's competitive business market, attention to detail is essential to the initial perception of your business and your parking lot is a major element in that first impression.

An Economical Advantage . . .

Competitive Initial Costs

For nearly the same cost (or even less) you can have a durable, attractive, safer and environmentally friendly concrete parking lot. Concrete has always made the most long-term sense, but initial cost was an obstacle. Today advances in design, modern construction methods, integral curb, 3D placement technology, have all made initial costs about the same

A Great Value

You get your money's worth with concrete. A concrete parking lot delivers superior performance, has a much longer life than asphalt, is far less expensive over its lifespan and requires little maintenance.

Making a Lasting Impression . . .

Strong and Durable

Concrete parking lots provide trouble-free service to business owners. The reason is simple. Concrete is strong and durable, with many parking lots lasting 30 years and longer without major maintenance.

Eye Catching

Concrete has become as decorative as it is durable. You can customize your concrete parking lot making it an extension of your building's appearance. Concrete surfaces can mimic a variety of designs, colors, textures, and patterns. You are only limited by your imagination of what sort of first impression you wish to make.



Mother Nature Approved . . .

Enhanced Safety

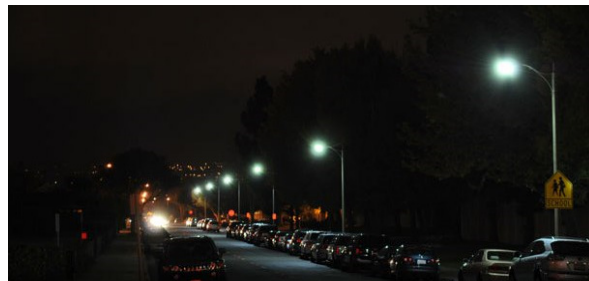
Concrete's bright, reflective surface provides safer surroundings for pedestrians and drivers at night.

Energy Savings

In new construction, concrete pavements need 1/3 fewer light poles. For existing lots, 400W bulbs can be reduced to 250W and still achieve higher luminance and 37.5% energy savings. With LED technology, wattage can be further reduced to 125W for an energy savings of nearly 69%."

Cooler and Cleaner

The cooler, more reflective pavement decreases ambient temperatures by 7-10 degrees, and slashes air conditioning needs during hot summer days. Concrete is cleaner than asphalt. On hot days the sticky tar finds its way onto your customers shoes then stains floor surfaces and car mats.



Thickness Design Worksheet

| Step 1 | Step 2 | Step 3 | Step 4 | Step 5 |
|---|--|---|--|---|
| Determine your soil (k or CBR) value from table 1 or a soil report. | Determine traffic category from table 2. | Determine the average daily truck traffic (ADTT*) on the pavement. See table 3. | Concrete compressive strength. For concrete exposed to freeze-thaw and deicing, minimum of 4000 psi recommended. | In table 3, read across row that corresponds to your traffic category and ADTT to the column that represents your concrete strength and soil value. |

| Example For Car Parking Use: Bank, Pharmacy, Office Parking, etc. | |
|--|---|
| > | Soil is sandy-gravel with some silt and clay Table 1 shows 130 - 170, so use $k=100$ |
| > | Traffic category is A per Table 2 |
| > | ADTT = 1 Note: safe to assume at least 1 ADTT |
| > | Located in a freeze-thaw environment, thus use minimum 4000 psi concrete |
| > | Thickness necessary for this situation is 4.5 inches according to Table 3 |

| Table 1 | | |
|---|-----------|-----------|
| Modulus of Subgrade Reactivity | | |
| Types of Subgrade Soil | k Value | CBR |
| Silt and Clay soils | 75 - 120 | 2.5 - 3.5 |
| Sand-Gravel soils with moderate silt and clay | 130 - 170 | 4.5 - 7.5 |
| Sandy soils | 180 - 220 | 8.5 - 12 |

This information, tables and charts are from
ACI-330R-08: Guide for the Design and Construction of Concrete Parking Lots

| Table 2 | |
|--|--|
| Traffic Categories | |
| Select Category A, B, C or D. | |
| Car Parking Areas & Access Lanes (Autos, pick-ups, and panel trucks only) | Category A |
| Shopping Center Entrance and Service Lanes | Category B |
| City & School Bus Parking Areas: ◇ Parking area and interior lanes. ◇ Entrance and exterior lanes. | Category B Category C |
| Truck Parking Areas: | |
| Parking Areas & Interior Lanes | Single-Unit Trucks* Multiple-Unit Trucks** |
| Entrance & Exterior Lanes | Single-Unit Trucks* Multiple-Unit Trucks** |
| | Category B Category C Category C Category D |

* Single-Unit Trucks = Bobtailed Trucks

** Multiple-Unit Trucks = Tractor-trailer units with 1 or more trailers

Table 3

20-year design thickness recommendations, inches (no dowels)

| | | k = 500 psi/in. (CBR = 50; R = 86) | | | | k = 400 psi/in. (CBR = 38; R = 80) | | | | k = 300 psi/in. (CBR = 26; R = 67) | | | |
|-------------------|---------------|---------------------------------------|------|------|------|---------------------------------------|------|------|------|---------------------------------------|------|------|------|
| f'_c | | 5000 | 4500 | 4000 | 3500 | 5000 | 4500 | 4000 | 3500 | 5000 | 4500 | 4000 | 3500 |
| MOR, psi | | 650 | 600 | 550 | 500 | 650 | 600 | 550 | 500 | 650 | 600 | 550 | 500 |
| Traffic Category* | A (ADTT=1) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.5 |
| | A (ADTT=10) | 4.0 | 4.0 | 4.0 | 4.5 | 4.0 | 4.0 | 4.5 | 4.5 | 4.0 | 4.5 | 4.5 | 4.5 |
| | B (ADTT=25) | 4.0 | 4.5 | 4.5 | 5.0 | 4.5 | 4.5 | 5.0 | 5.5 | 4.5 | 4.5 | 5.0 | 5.5 |
| | B (ADTT=300) | 5.0 | 5.0 | 5.5 | 5.5 | 5.0 | 5.0 | 5.5 | 5.5 | 5.0 | 5.5 | 5.5 | 6.0 |
| | C (ADTT=100) | 5.0 | 5.0 | 5.5 | 5.5 | 5.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 6.0 |
| | C (ADTT=300) | 5.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 6.0 | 5.5 | 6.0 | 6.0 | 6.5 |
| | C (ADTT=700) | 5.5 | 5.5 | 6.0 | 6.0 | 5.5 | 5.5 | 6.0 | 6.5 | 5.5 | 6.0 | 6.5 | 6.5 |
| | D (ADTT=700)† | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| | | k = 200 psi/in. (CBR = 10; R = 48) | | | | k = 100 psi/in. (CBR = 3; R = 18) | | | | k = 50 psi/in. (CBR = 2; R = 5) | | | |
| f'_c | | 5000 | 4500 | 4000 | 3500 | 5000 | 4500 | 4000 | 3500 | 5000 | 4500 | 4000 | 3500 |
| MOR, psi | | 650 | 600 | 550 | 500 | 650 | 600 | 550 | 500 | 650 | 600 | 550 | 500 |
| Traffic Category* | A (ADTT=1) | 4.0 | 4.0 | 4.0 | 4.5 | 4.0 | 4.5 | 4.5 | 5.0 | 4.5 | 5.0 | 5.0 | 5.5 |
| | A (ADTT=10) | 4.5 | 4.5 | 5.0 | 5.0 | 4.5 | 5.0 | 5.0 | 5.5 | 5.0 | 5.5 | 5.5 | 6.0 |
| | B (ADTT=25) | 5.0 | 5.0 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 6.0 | 6.0 | 6.0 | 6.5 | 7.0 |
| | B (ADTT=300) | 5.5 | 5.5 | 6.0 | 6.5 | 6.0 | 6.0 | 6.5 | 7.0 | 6.5 | 7.0 | 7.0 | 7.5 |
| | C (ADTT=100) | 5.5 | 6.0 | 6.0 | 6.5 | 6.0 | 6.5 | 6.5 | 7.0 | 6.5 | 7.0 | 7.5 | 7.5 |
| | C (ADTT=300) | 6.0 | 6.0 | 6.5 | 6.5 | 6.5 | 6.5 | 7.0 | 7.5 | 7.0 | 7.5 | 7.5 | 8.0 |
| | C (ADTT=700) | 6.0 | 6.5 | 6.5 | 7.0 | 6.5 | 7.0 | 7.0 | 7.5 | 7.0 | 7.5 | 8.0 | 8.5 |
| | D (ADTT=700)† | 7.0 | 7.0 | 7.0 | 7.0 | 8.0 | 8.0 | 8.0 | 8.0 | 9.0 | 9.0 | 9.0 | 9.0 |

* ADTT = Average Daily Truck Traffic. Trucks are defined as vehicles with at least 6 wheels; excludes panel trucks, pickup trucks, and other 4-wheeled vehicles. Refer to Appendix A.

k = Modulus of subgrade reaction; CBR = California Bearing Ratio; R = Resistance value; and MOR = Modulus Of Rupture.

† Thickness of Category D (only) can be reduced by 1.0 in. (25 mm) if dowels are used at all transverse joints (that is, joints located perpendicular to direction of traffic). Note: 1 in. = 25.4 mm; 1 psi = 0.0069 MPa; and 1 psi/in. = 0.27 MPa/m.

Design Assistance Program



The NRMCA offers a **Design Assistance Program (DAP)** that supports designers and specifiers with concrete parking lot designs.



Scan this QR code to visit the Design Assistance Program webpage.

The program provides parking lot design recommendations including CAD jointing plans. This helps specifiers deliver quality paving designs to ensure successful concrete projects. Design assistance services are provided for conventional concrete projects as well as pervious, roller compacted and concrete overlay designs.

How do I submit a project for Design Services?

Submit by completing the application form and provide the information and files requested.

Transmit all the data directly to Amanda Hult: ahult@nrmca.org

How fast will I receive a Design Suggestion?

Typically take 5-7 business days depending on complexity. 10 days for more complex projects.

How much will the service cost?

Design suggestions are FREE!

What is included in the Design Suggestion?

A detailed submittal letter with recommended pavement thickness, potential project specifications, base materials, subgrade drainage, etc. Scale CAD drawing with jointing plan with suggested design details.

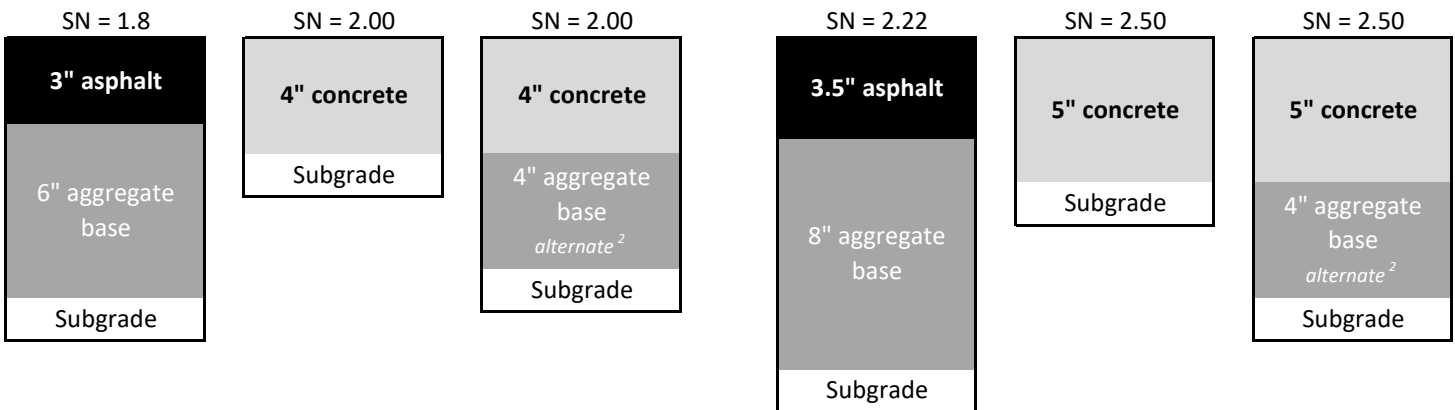
Disclaimer stating it complies to current industry standards. Final design is up to the engineer of record.

Equivalent Parking Lot Pavement Designs

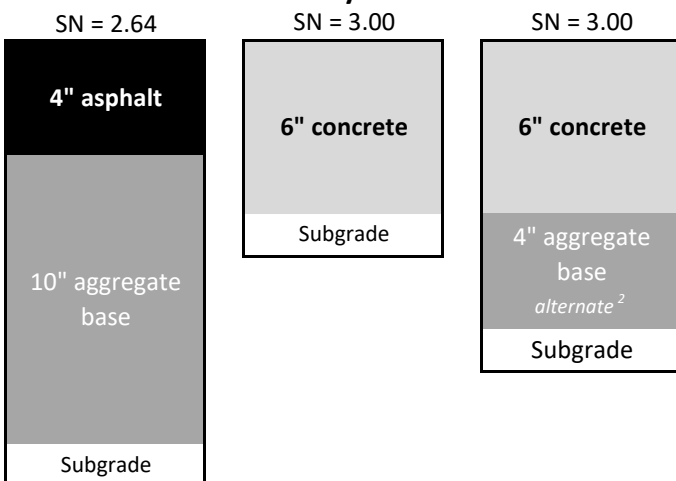
Illustrations below are for quick reference and comparisons only. Actual paving material thickness should be based upon soil conditions and intended use.

Structural Number (SN) for concrete and asphalt thickness is determined by structural layer coefficient of local materials. ¹

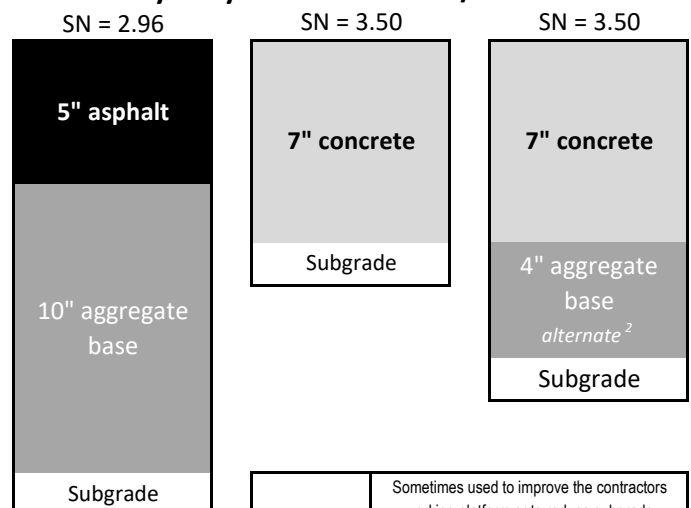
Light Duty: Commercial / Retail / Office



Medium Duty: Mixed Use



Heavy Duty: Truck Facilities / Industrial



Coefficients of 1 inch of Material: ¹

| | |
|---------------------------|---------------------------|
| Concrete = 0.5 | Aggregate Base = 0.12 |
| Asphalt Wear Course = 0.4 | Asphalt Base Course = 0.3 |

Alternate:²

Sometimes used to improve the contractors working platform or to reduce subgrade susceptibility to pumping and erosion (ACI-330). Does not increase structural number under concrete.