

Concrete Overlays

The increased use of concrete overlays might have you asking some questions. Here are some facts about concrete overlay trends and a list of useful resources.

Solutions to an Escalating Problem

Even though the first concrete overlays date back to the early 1910s and at least 375 concrete overlays had been constructed by 1981 [NCHRP 1982], the use of concrete overlays did not become a nationally accepted practice until the mid-2000s. Tightening budgets and **increases in the cost and volatility of asphalt** led engineers to look for a long-term cost-effective and sustainable solution, which they found in the form of concrete overlays. As of 2004, the total square yards of concrete overlays thinner than 6 inches in the United States was approximately 1.2 million. Due largely to a sustained education and implementation effort by industry and FHWA, the widespread adoption of thin concrete overlay technologies across the country led to over 8 million square yards of concrete overlays thinner than 6 inches having been constructed in 2009 and 2010 (Figure 1).

Square Yards, Thin Overlays

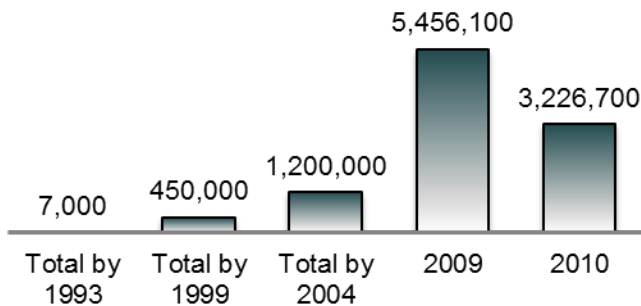


Figure 1. Construction totals of thin (<6 inches) concrete overlays in the United States.

There's a Concrete Overlay for That

Regardless of whether an existing pavement consists of concrete, asphalt, or a composite of several different materials, there is a concrete overlay option that can be used. Bonded concrete overlays add structural capacity or eliminate surface distresses in existing pavements that are in relatively good structural condition and unbonded concrete overlays are used to rehabilitate pavements with greater structural deficiencies (Figure 2).

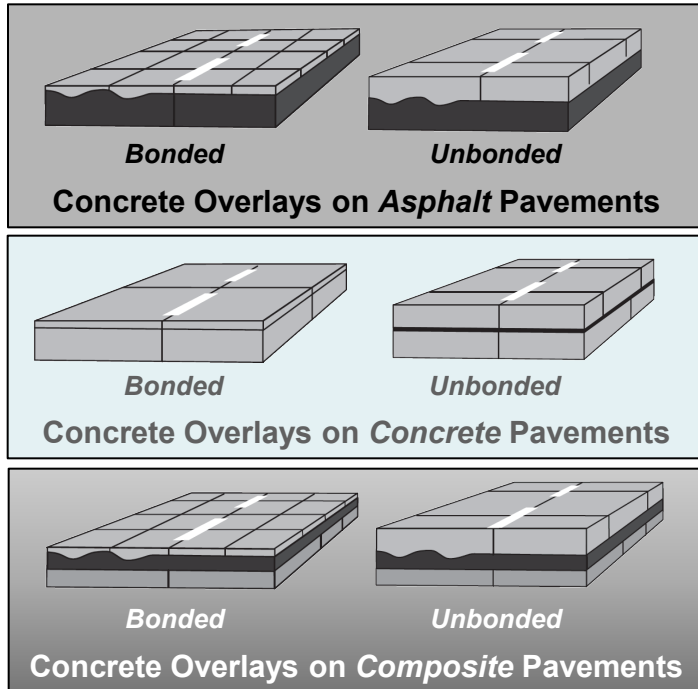


Figure 2. The various concrete overlay offerings [CP Tech Center 2008].

A Century Worth of Experience

Design and construction details for more than 1,000 concrete overlays are available in the ACPA's online National Concrete Overlay Explorer, as well as the National Cooperative Highway Research Program's (NCHRP's) Synthesis 99 and 204. Of the more than 1,000 overlays catalogued, about 57% were placed on concrete, 41% on asphalt, and 2% on composite. For overlays on concrete and asphalt, about 25% were bonded and 75% were unbonded.

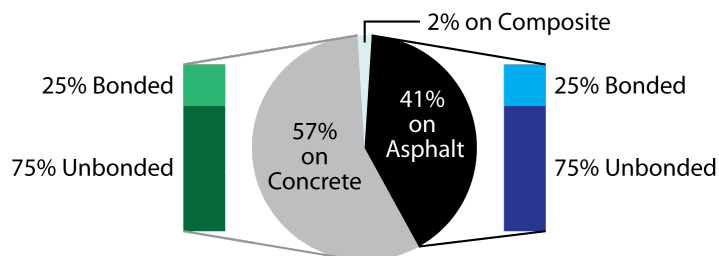


Figure 3. Breakdown of historical concrete overlay applications [NCHRP 1982 and 1994, ACPA NCOE].

Setting the Performance Standard

Like any pavement design for a new construction or reconstruction, a concrete overlay can be designed to serve any number of years. There are, however, typical expectations for each overlay type (Table 1).

Table 1. Typical Overlay Service Lives [FHWA 2002]

Concrete Overlay Type	Typical Life
Bonded on Concrete	15-25 years
Unbonded on Concrete	20-30 years
Bonded on Asphalt/Composite	5-15 years
Unbonded on Asphalt/Composite	20-30 years

Want More Details?

While much research and many publications have been completed on concrete overlays in the 100 years since their inception, here are a few key resources if you would like to learn more:

General Information on Concrete Overlays

- Guide to Concrete Overlays, CP Tech Center, 2008, <http://www.cptechcenter.org>
- Concrete Overlays, TERRA, 2011, http://www.terraroaddalliance.org/documents/factsheet_concreteoverlays.pdf

Information on Design of Concrete Overlays

- Design of Concrete Overlays using Existing Methodologies – A Technical Summary, CP Tech Center, 2011, <http://www.cptechcenter.org>
- Bonded Concrete Overlay on Asphalt Thickness Designer, ACPA Web Application Library, 2011, <http://apps.acpa.org/apps/bcoa.aspx>

Design Details and Performance History of Existing Concrete Overlays

- The National Concrete Overlay Explorer, ACPA, <http://overlays.acpa.org>
- FHWA, Portland Cement Concrete Overlays – State of the Technology Synthesis, 2002, FHWA-IF-02-045
- NCHRP Synthesis 99, Resurfacing with Portland Cement Concrete, 1982
- NCHRP Synthesis 204, Portland Cement Resurfacing – A Synthesis of Highway Practice, 1994
- NCHRP Synthesis 338, Thin and Ultra-Thin Whitetopping, 2004
- PCA/ACPA, Continuously Reinforced Concrete Overlays – 1975 Condition Survey, 1976, SR180.01P
- PCA/ACPA, 1977 Condition Survey of Concrete Resurfacing, 1978, SR211.01P

Sources

- ACPA NCOE, Nation Concrete Overlay Explorer, <http://overlays.acpa.org>.
- CP Tech Center 2008, Guide to Concrete Overlays, <http://www.cptechcenter.org/>.
- FHWA 2002, Portland Cement Concrete Overlays – State of the Technology Synthesis, FHWA-IF-02-045
- NCHRP 1982, Resurfacing with Portland Cement Concrete, Synthesis 99
- NCHRP 1994, Portland Cement Resurfacing – A Synthesis of Highway Practice, Synthesis 204



Figure 4. Some of the concrete overlay resources that are available FREE OF CHARGE.