

CHAPTER 11

THIN BONDED RIGID OVERLAYS FOR RIGID PAVEMENTS

11-1. General. Although the volume of concrete required for a thin bonded overlay is comparatively small, this surface layer is the portion exposed to traffic and weathering and must be of the highest possible quality. A complete bond must be obtained between the rigid pavement and the overlay. The thickness of the overlay will be not less than 2 inches but not more than 5 inches. The required thickness for unbonded or partially bonded overlays will be determined in accordance with EM 1110-3-132 for strengthening roads and streets and in accordance with EM 1110-3-142 for strengthening airfields.

11-2. Correction of defects in existing pavement. The existing pavement must be in good structural condition, and any broken or otherwise defective slabs will be repaired or replaced before the overlay is applied. The designer of the overlay should realize that cracks in the pavement being overlaid will likely reflect through the overlay pavement. A condition survey should be made and the cause of cracking of slabs determined in order to develop the corrective measure needed for the repair. If cracks are load associated, it is likely that repair is needed in the underlying material, the entire slab might need to be removed, repairs should be made to the underlying material, and the concrete should be replaced. When cracks in the pavement are associated with temperature or shrinkage, consideration should be given to not replacing the slab and accepting the fact that the underlying crack will reflect through the overlay. In cases where only partial removal of a slab is required to correct causes of failure, a sufficient number and size of tie bars should be installed by drilling the remaining slab and epoxy grouting the tie bars in place before placing the concrete in the areas removed. When partial slab removal is used, the portion of the slab remaining in place should be in one piece and not less than one-half the size of a single slab. Concrete used in slab replacement will be of the same strength and quality as the concrete used in the original pavement construction.

11-3. Flexural strength. In general, flexural strength for the thin bonded overlay will be the same as that obtained for the original pavement construction at the corresponding age.

11-4. Aggregate sizes. A 1/2-inch maximum coarse-aggregate size should be specified for a thin bonded overlay of 2-inch thickness. If the overlay is 3 to 5 inches thick, additional coarse-aggregate gradations will be specified. The maximum nominal aggregate size used will not exceed one-fourth the overlay thickness. Overlay thickness used in determining coarse-aggregate size will not include additional thickness for leveling. The entrained air content will be increased nearer the upper limit as the minimum coarse-aggregate size is decreased.

9 Apr 84

11-5. Cement. Portland cement is required for thin bonded overlays. Normally, the Contractor's option of Type I or Type II cement will be specified. Type III cement should not be specified except where an early opening of the pavement to traffic is essential. Natural cements and slag cements will not be used.

11-6. Conditioning of existing pavements. For satisfactory performance of thin bonded overlays, the existing pavement surface must be thoroughly cleaned of all deteriorated concrete, oil, grease, and dirt. In order to accomplish a thoroughly clean surface, it is recommended that rotary type grinders be used to remove at least 1/4 inch of the existing concrete, and in areas where the concrete has deteriorated, the material should be removed to sound concrete. After grinding with rotary grinders, the surface should be sandblasted to remove debris left from grinding. Before the pavement is placed, the surface of the existing pavement should be cleaned by brooming and followed with compressed air. In areas where equipment turns, such as a truck hauling concrete, the existing pavement should be covered with sand or some other protective cover to prevent rubber from scrubbing off of tires onto the existing concrete and forming a bond breaker. Either a neat cement slurry or cement and sand grout is satisfactory for bonding the overlay to the existing surface. These may be applied by pressure spraying or by brooming over the existing surface, but they should be applied to a dry surface and applied only 6 to 10 feet ahead of concrete placing. If the grout or slurry dries before concrete is placed, it should be removed and fresh material applied.