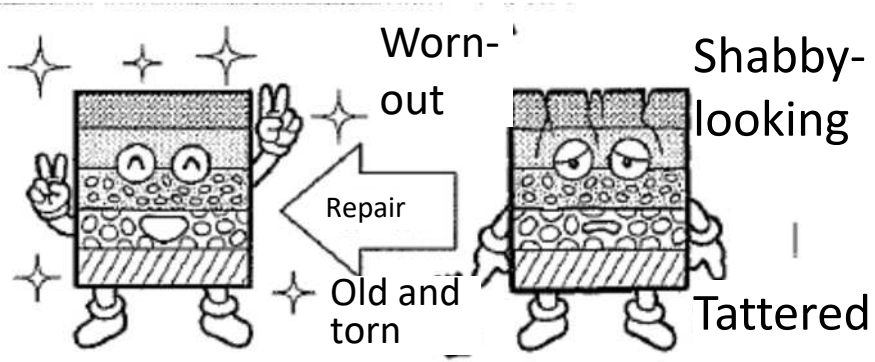
Chapter 3: Types of Repair Methods I: Repair Methods

The repair method is to repair the pavement to an appropriate pavement with drastic measures when it becomes difficult to maintain a structurally and functionally good road surface due to significant damage to the pavement.

Asphalt pavement repair methods include overlay methods, cutting overlay methods, replacement methods, road surface layer regeneration methods and the like.

Since there are many different types and causes of pavement failure, the results of various surveys and other data should be considered when adopting repair methods.



3.1 Overlay method

The overlay method involves layering an asphalt mixture layer on top of an existing pavement. This method is applied when the pavement is damaged and is expected to cover the entire surface in the near future, or when the pavement structure is insufficient due to an increase in traffic volume.

① Increasing bearing capacity of pavement
② Restoring bearing capacity of paved pavement
③ Recovery of functions such as road flatness and slip resistance
④ Addition of new functions

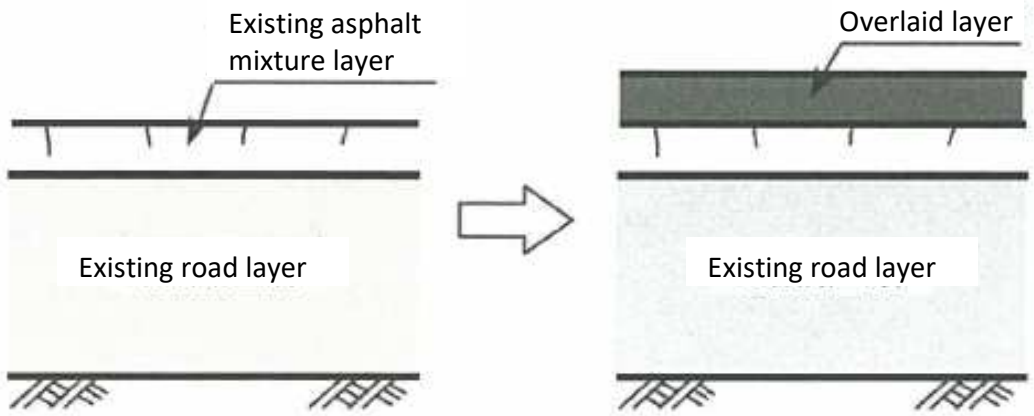


Diagram of overlay method

3.2 Cutting overlay method

In this method, a part of the existing asphalt mixture is cut and then overlaid, which can be done either by replacing the cut thickness or by laying a thicker pavement up to the shortage of pavement thickness.
Unlike the overlay method, the cut overlay method uses a road surface cutting machine.

Cutting overlay method

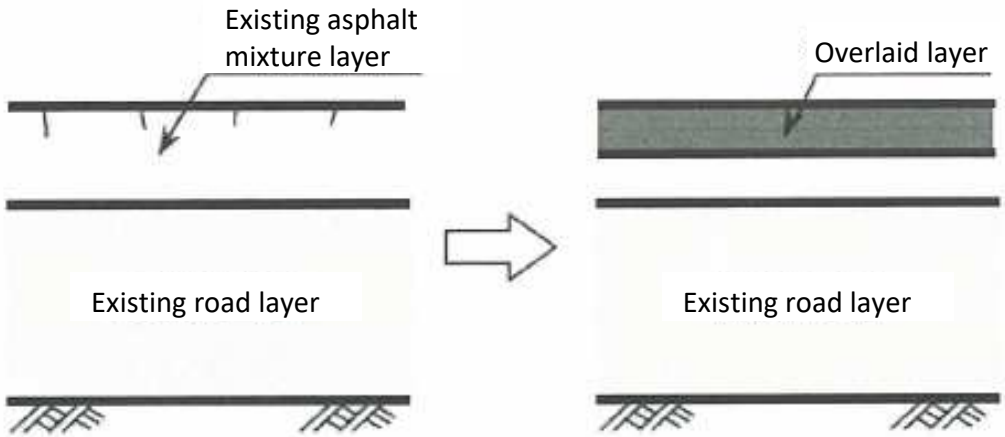
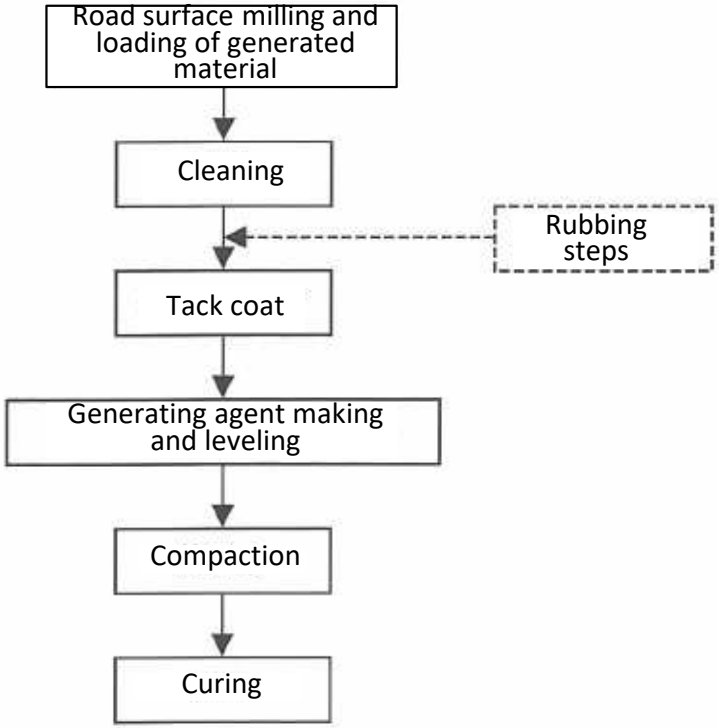


Diagram of cutting overlay method



Construction flow

Cutting / loading status

Cleaning status

3.3 Replacement method

A construction method in which part or all of the existing pavement is removed and a new pavement is created. It is applied when the cause of significant damage to the pavement extends to the roadbed/roadbase or when the height of the road surface is restricted. Examples of the form of damage to which this method is applied include ruts and cracks caused by a decrease in bearing capacity or subsidence of the roadbed.

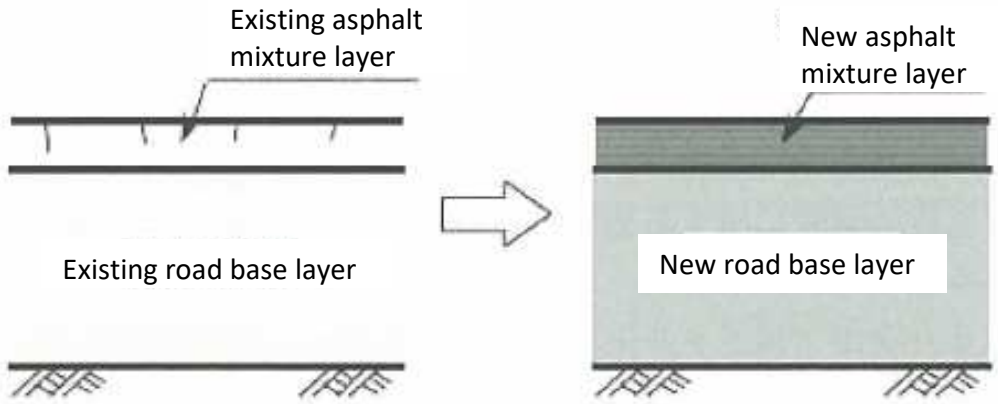
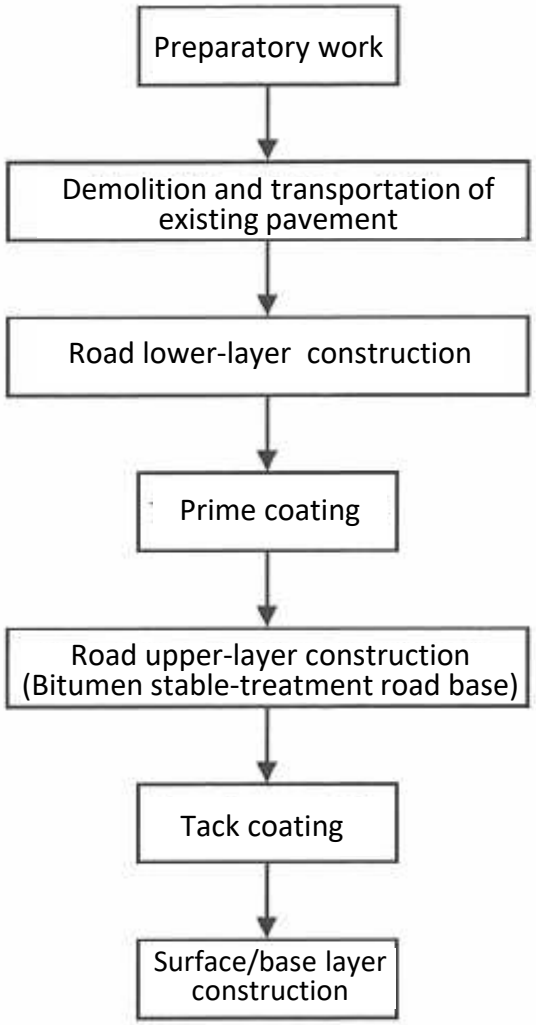


Diagram of replacement method

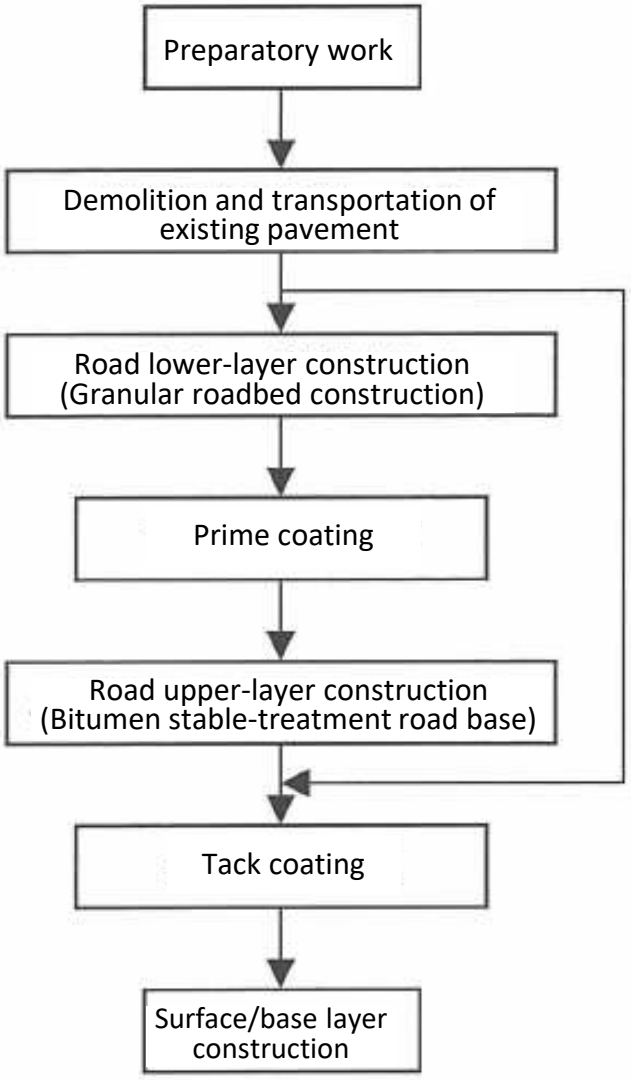
Base layer materials such as modified asphalt mixtures, large grain asphalt mixtures and semi-flexible pavements are used when more durability is required.
In many cases, the work from the demolition of the existing pavement to the roadbed/road base must be done in one day. Therefore, in that case, the construction area per day is small.



Construction flow

3.4 Local replacement method

If there is significant damage to the existing pavement, such as cracks, etc., and the preliminary investigation, etc. shows that the area is structurally damaged, this method replaces the pavement locally from the surface and base layers or the roadbed.
It is usually used together with the overlay method or the cutting overlay method where the degree of localized damage is significant.



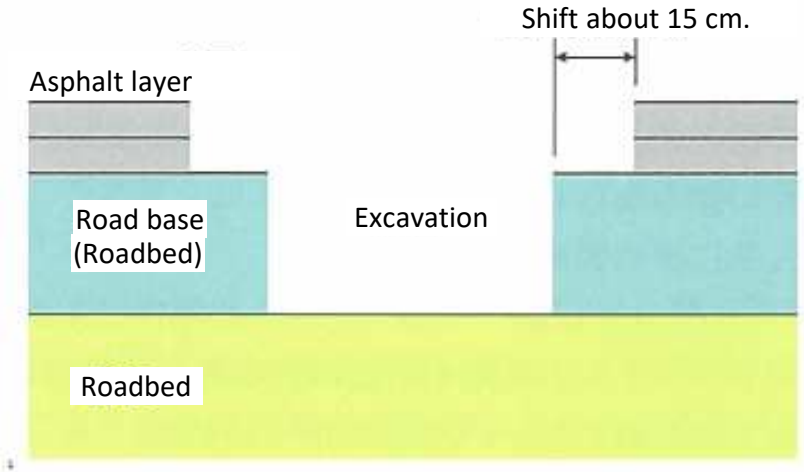
Construction flow

Local replacement method

Local replacement method

① Since it is easy to sink when the traffic is released, it is necessary to carefully compact it during construction.

② When constructing two or more layers, the upper layers should be removed more widely to avoid overlapping joints and to facilitate compaction as well.



Excavation cross-section of local replacement

3.5 On-road road base regeneration method

A construction method in which the existing asphalt surface layer generated at the time of destruction is crushed on the road and mixed with the granular road base in the lower layer to make a new road base.
Cement, cement and emulsion or foamed asphalt can be used as a stabilizer. Almost no pavement-generating material is generated. This method is applied to areas of relatively thin pavement (less than 15 cm thick of existing asphalt mixture) where there is not much traffic.

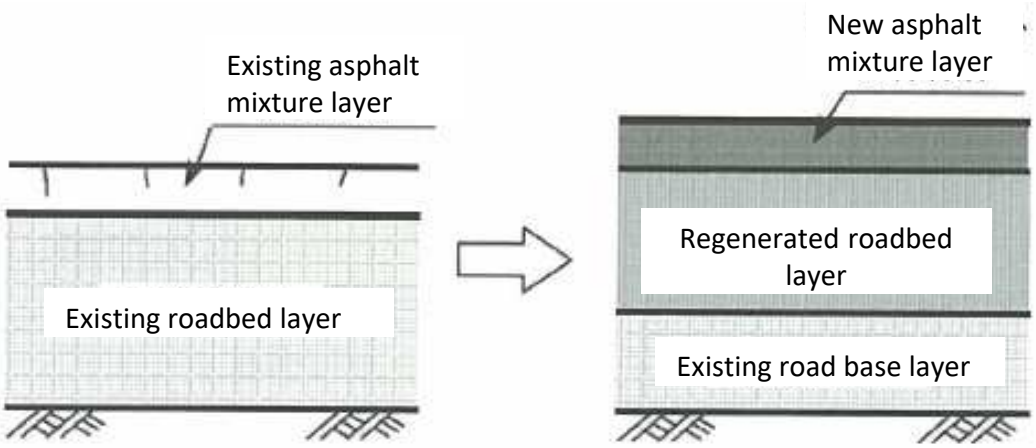
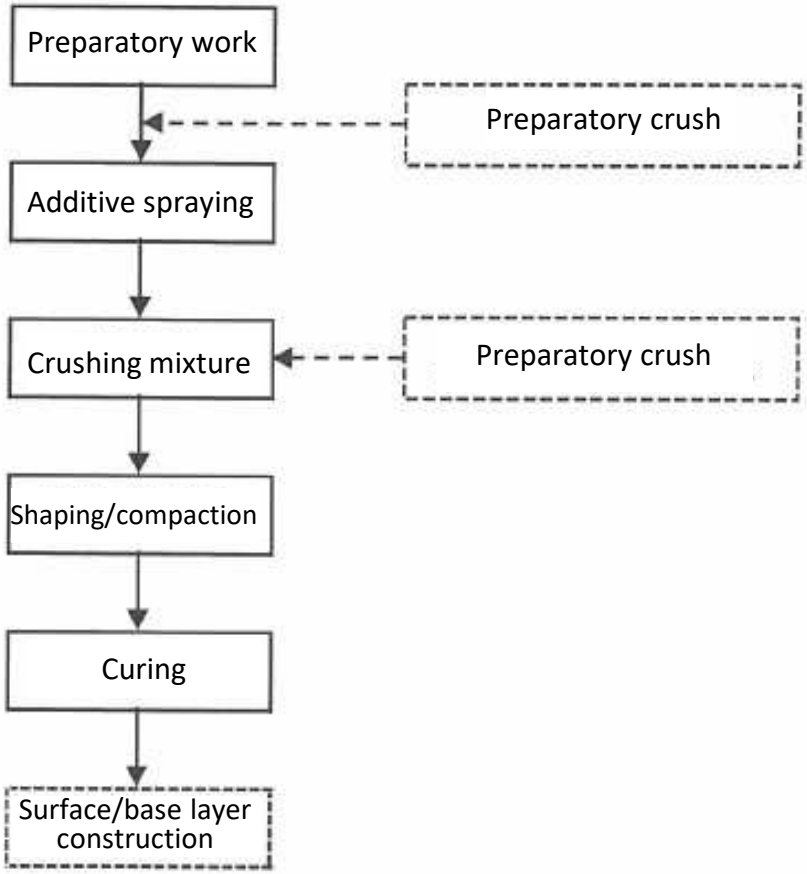


Diagram of on-road roadbed regeneration method

Mechanical spraying of cement

Crushing and mixing



Construction flow

Shaping/compaction status

Care should be taken to ensure that the maximum particle size of the crushed existing asphalt mixture is 50 mm or less during crushing and mixing.

If there are multiple construction lanes, secure a stacking width of about 10 cm. If the thickness of the regenerated roadbed exceeds 20 cm, use a vibrating roller with large compaction effect.