

Attachment 10.1- Otta Seal vs Conventional Seal

Why Otta Seal?

After bituminous sealing of a road, the need for reseal is determined by two parameters -

1. Polishing of stone or stone embedment
2. Bitumen embrittlement due to oxidation

Usually the oxidation of bitumen is a chemical process. The rate is higher if bitumen exposed area is high. On the other hand the polishing of stones is the result of effect of traffic on road surface and hardness of stones used in sealing.

Usually for optimization of resource the stone type and size are determined such that the intervention level after application matches with intervention level of bitumen oxidation. It has been proven effective and cost economic for high traffic roads.

However in Narrandera region the highest annual average traffic volume on local roads is in the range of 2-5% of average traffic volume on metropolitan roads. Therefore because of minimal amount of traffic resealing need to be done due to bitumen oxidation even though stone polishing is less than 10% of intervention level.

With Otta seal, longer useful life of seal is achieved at reduced cost because:

1. Due to application of mix of varied grade material, the void in the stone matrix is reduced, which reduces the exposed area of bitumen. This reduces the oxidation of bitumen
2. As stone polishing is not an issue, instead of blue metal (hard rock) normal gravel similar to DGB 20 specification is used. This is obviously cheaper and can be produced locally
3. Reduced damage on the road due to delivery of sealing stones
4. Cost of precoating is saved
5. Usually a second coat followed by primer sealing is not required

Research suggests that Otta seal can last about 25 years, compare to 15 years average useful life of conventional seal. The following analysis is done to compare equivalent future value of 5000 m² (1000m x 5m) of road, sealed using conventional spray seal and Otta seal.

Otta Seal 20 mm; 3 reseal followed by initial new seal - cost analysis

Present Value PV	number of year	interest rate I (%)	FV in 75 Years FV ₇₅
\$19,000	75	3	\$174,400
\$19,000	50	3	\$83,294
\$19,000	25	3	\$39,782
\$19,000	0	3	\$19,000
Total FV			\$316,476
Equivalent present value			\$34,478

Table 1: Economic analysis of 5m wide Otta sealed road of length 1000 metres

**Conventional seal; 5 reseals followed by
14 mm primerseal and 10 mm reseal – cost analysis**

Present Value PV	number of year	interest rate I (%)	FV in 75 Years FV ₇₅
\$18,000	75	3	\$165,221
\$25,000	75	3	\$229,473
\$18,000	60	3	\$106,049
\$18,000	45	3	\$68,069
\$18,000	30	3	\$43,691
\$18,000	15	3	\$28,043
\$18,000	0	3	\$18,000
Total FV			\$658,546
Equivalent Present Value			\$71,745

Table 2: Economic analysis of 5m wide spray sealed road of length 1000 metres

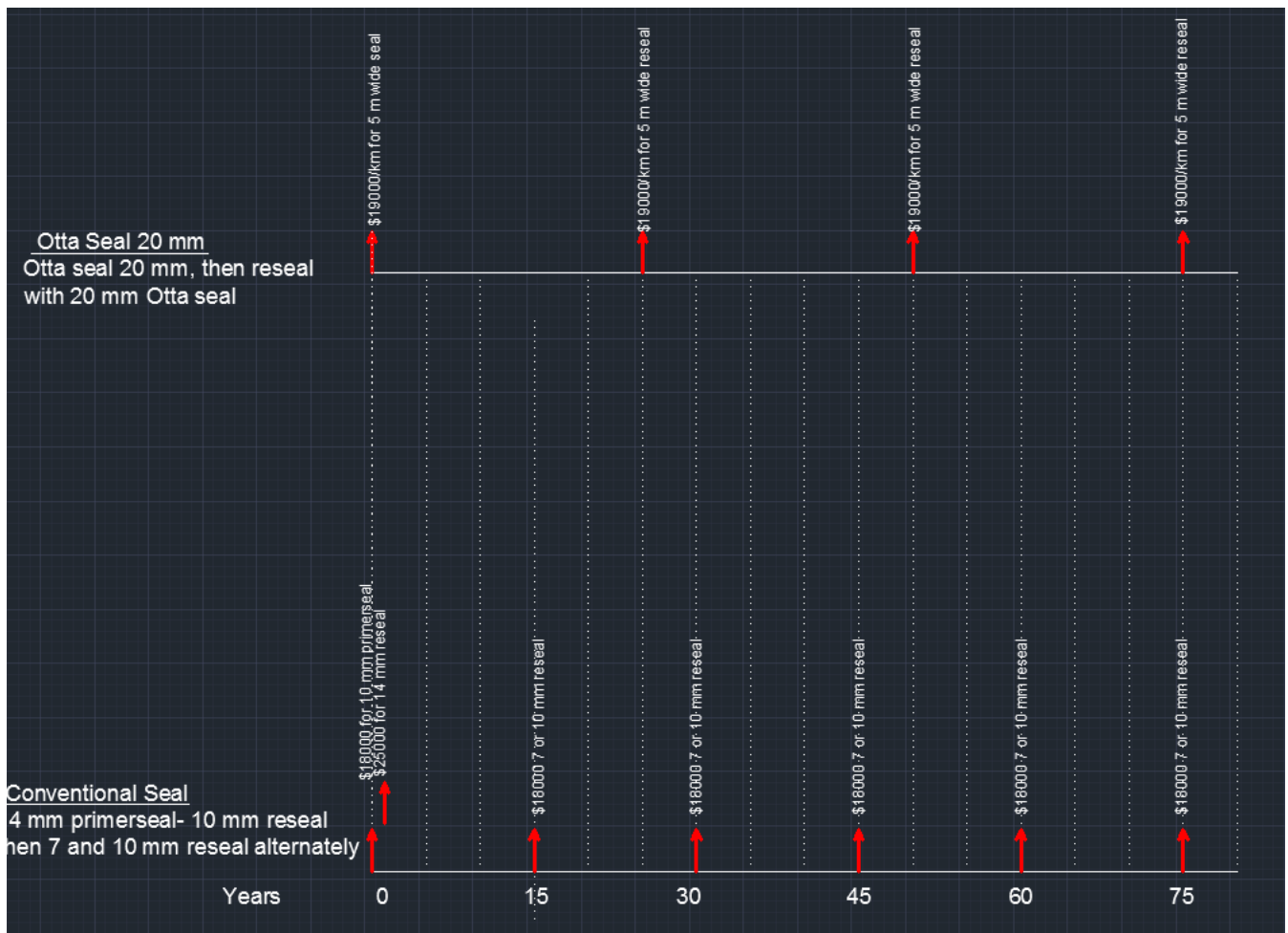


Fig 1: Cash flow for Otta Seal and conventional seal