

Return on Investment (ROI) from Building Quality Pavement Foundations

The return on investment (ROI) from building quality foundations under pavement can be significant but depends on initial construction costs, future maintenance costs, impact to public safety, and the lifespan of the pavement.

Investing in a stable and durable foundation reduces the ownership costs for the agency, protects the motorist with better ride quality and a safer driving experience, and keeps roadways open with less disruption from reconstruction and patching of the pavement surface. The differential cost of building a quality foundation is relatively small compared to the value of expanding the performance life of the pavement and reducing impacts to the motorist.

Key points when evaluating the ROI of building quality pavement foundations include:



Initial Construction Costs: Construction of quality foundations often requires additional investment during the initial construction phase involving use of better materials, use of stabilization materials, better compaction, and improved inspection. However, investing in high-quality materials and proper construction techniques helps ensure the long-term stability of the pavement.



Operational Considerations: Transportation Systems Management and Operations (TSMO) strategies, activities, and services maximize the performance of transportation systems. Investing in quality pavement foundations is part of a comprehensive and relatively low cost TSMO strategy to keep traffic moving by avoiding lane closures for maintenance, thus protecting construction workers and the public while keeping roadways open.



Extended Pavement Lifespan: A durable, stable and resilient foundation provides a solid base for the pavement surface, helping to reduce non-uniform settlement and cracking over time. This extends the lifespan of the pavement and reduces the need for costly repairs and replacements. The most common reason for early pavement distress is failure of the foundation layers.



Reduced Maintenance Costs: Investing in a stable foundation lowers maintenance costs associated with repairing potholes, cracks, and other pavement damage. This results in long-term cost savings and a higher ROI for the pavement project. Repairing poorly constructed pavement foundations after the pavement is placed can be more than 10,000x's more costly than constructing quality foundation during initial construction.



Improved Performance: Quality foundations improve the overall performance of the pavement by providing a smooth and even surface for vehicles over the design life of the pavement. This enhances safety, reduces wear and tear on vehicles, and improves the driving experience for motorists.



Environmental Considerations: Building stable foundation layers have environmental benefits by reducing the need for frequent maintenance activities that generate waste and pollution. A longer-lasting pavement lowers the environmental impact of road construction and maintenance. Quality foundations are also more durable and resilient to extreme weather events.



Economic Benefits: Investing in quality foundations infrastructure can have broader economic benefits by improving transportation efficiency, reducing traffic congestion, and supporting economic development in the surrounding area. This leads to indirect ROI through increased property values, business activity, and overall quality of life for residents.

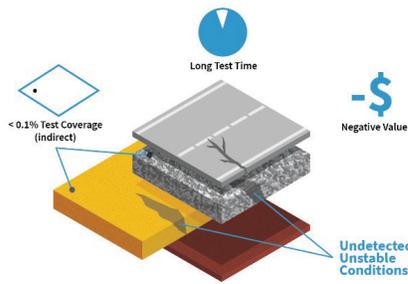
Although pavement foundations are the lower cost component of a pavement system, the foundation plays a critical role in maximizing pavement life. Pavement foundation layers should be constructed to high quality, constructed with 100% e-Compaction verification documentation, and built with real-time monitoring to maintain high construction productivity while addressing unstable work areas before the pavement is placed.

Supporting the same pavement layer thickness, pavement life is extended by 20 to 50% with a higher-vs. lower-quality foundation. The ROI for improved pavement foundation is therefore a critical consideration for extending pavement life.

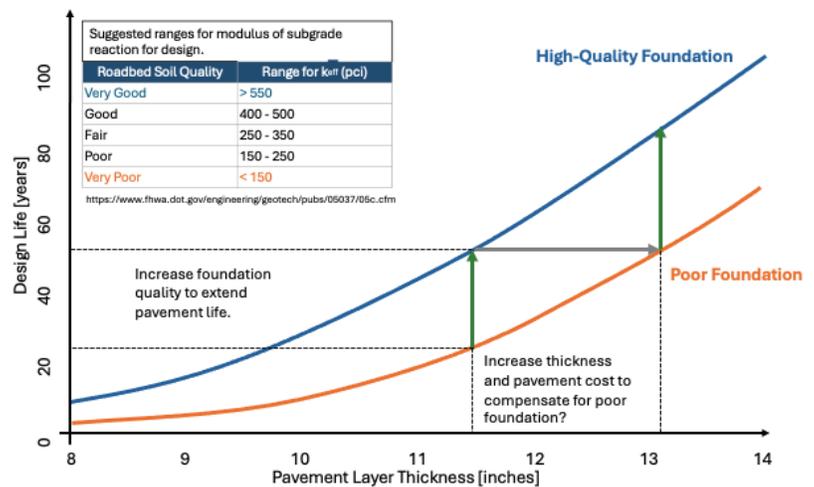
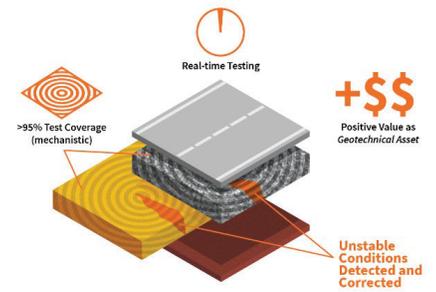
In brief, while the upfront costs of building quality pavement foundations may be higher, the long-term benefits in terms of reduced maintenance costs, extended pavement lifespan, improved performance, improved safety to construction workers and the public, environmental sustainability, and economic growth result in a favorable ROI over time.

Evaluate these factors holistically when considering the lowest up front cost versus the ROI of investing in stable foundations under pavements.

~40 year lifespan=
state of practice for pavement
design life



100+ year lifespan=
engineering requirement for
sustainable pavement systems



Did you know?

According to an AID national survey of State DOTs (<https://publications.iowa.gov/39532/>)

- 97% want more effective quality verification for pavement foundation construction.
- 70% believe pavements are being compromised because of foundation issues.
- 94% want to field verify mechanistic properties used in pavement design.



Build Better From the Ground Up