

Knovel®

ENGINEERING, DESIGN AND CONSTRUCTION

## Solution Story: Engineer devises plant infrastructure modification, saving \$180,000

Knovel surfaces foundational knowledge and the data insights needed to cut costs



### Summary

A large engineering, design and construction company involved in the construction of a sulfuric acid and power plant must address its clients demand to reduce project costs. A company engineer uses information from Knovel to find foundational knowledge and discover data insights, which help him conceive a design change that provides significant cost savings for the client



## Knovel's search and browse functions enabled Smithson to find foundational knowledge and identify relevant best practices to solve his cost-saving challenge.

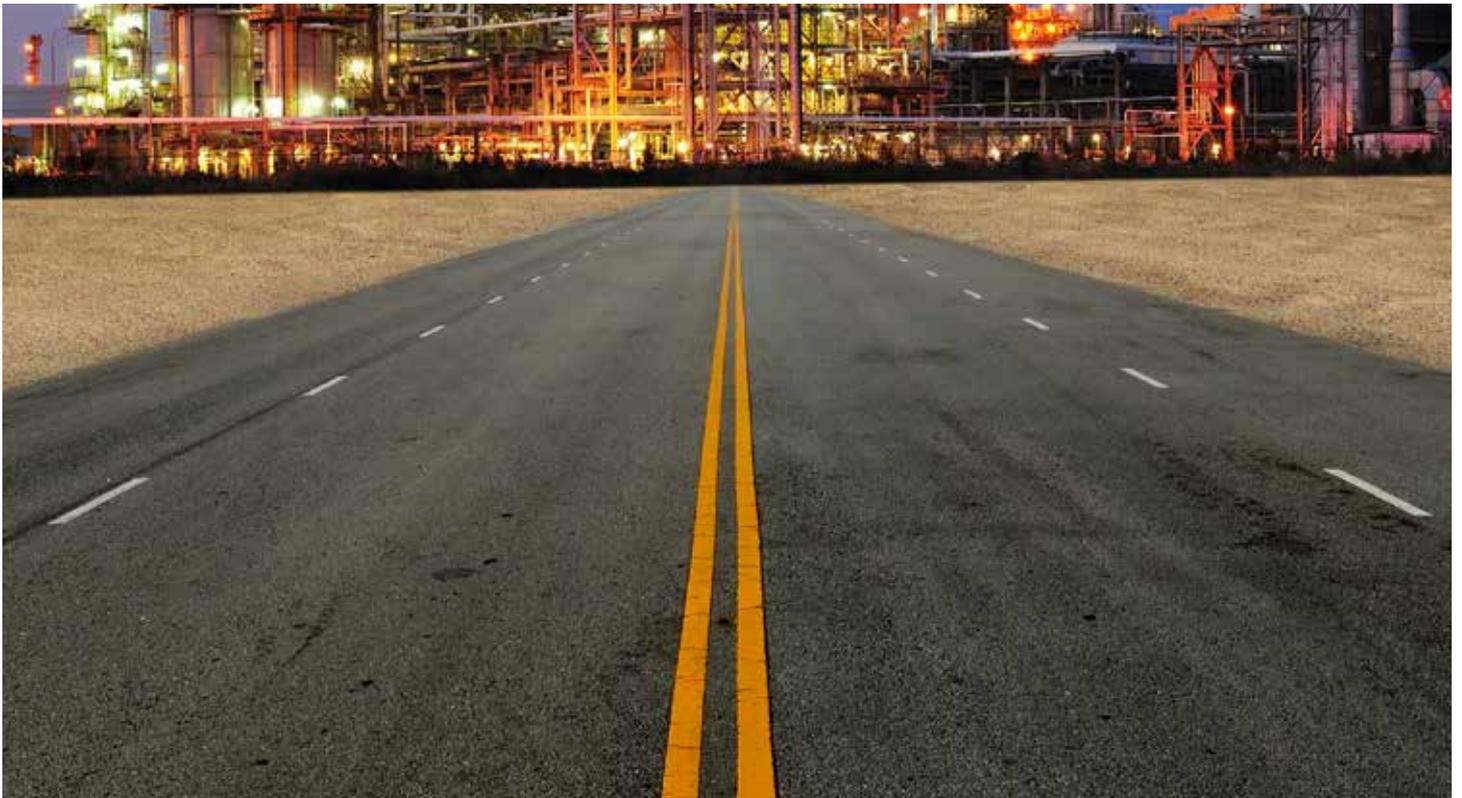
### Challenge

In all construction projects, saving costs is a top-of-mind concern for clients and ED&C firms. Engineers often need to find ways to cut expenses while preserving the integrity of the original design and ensuring outcome quality.

A large ED&C company that provides end-to-end project solutions in a variety of industry sections is involved in the construction of an \$800 million sulfuric acid and power plant in a Middle Eastern country. It tasked a Change Engineering Specialist with finding specific ways to reduce the project's costs for the company's client.

Engineer Kiril Smithson\* soon focused in on one element of the project—a 2.8 km roadway that would be located within the plant. The 6-meter wide road was designed as flexible pavement, with 120 mm of asphalt atop a 130mm base layer and a 200 mm sub-base layer. The engineer believed that the roadway offered a cost-savings opportunity. By determining an acceptable thickness for each pavement stratum, he realized that he may be able to propose an alternate roadway design that could result in significantly lower expenses.

To verify his hypothesis, the engineer needed to research and analyze engineering data to ensure any proposed changes to the road design would meet project specifications. Because the timeline for construction was tight, speed was of the essence.



\* For confidentiality purposes, names have been changed

### Solution

To research his project, Smithson used Knovel to find trusted information to solve his engineering problem. He easily accessed extensive technical references relevant to his inquiry about flexible pavement thicknesses, including indispensable resources from the American Association of State Highways and Transportation Officials (AASHTO) collection.

By using Knovel's relevance-sorting search engine, the engineer quickly located two formulas he needed to make critical calculations about the thickness of each pavement layer for the plant's roadway. He found the formula for Structural Number (SN), which encompasses traffic loads and other factors involved in the overall structural requirements of pavement. Knovel provided a convenient homograph that solved Smithson's SN equation graphically. He also discovered an equation that estimates the Modulus of Resilience—the stiffness of sublayers to withstand the stresses caused by rapidly applied loads that pavements typically experience.

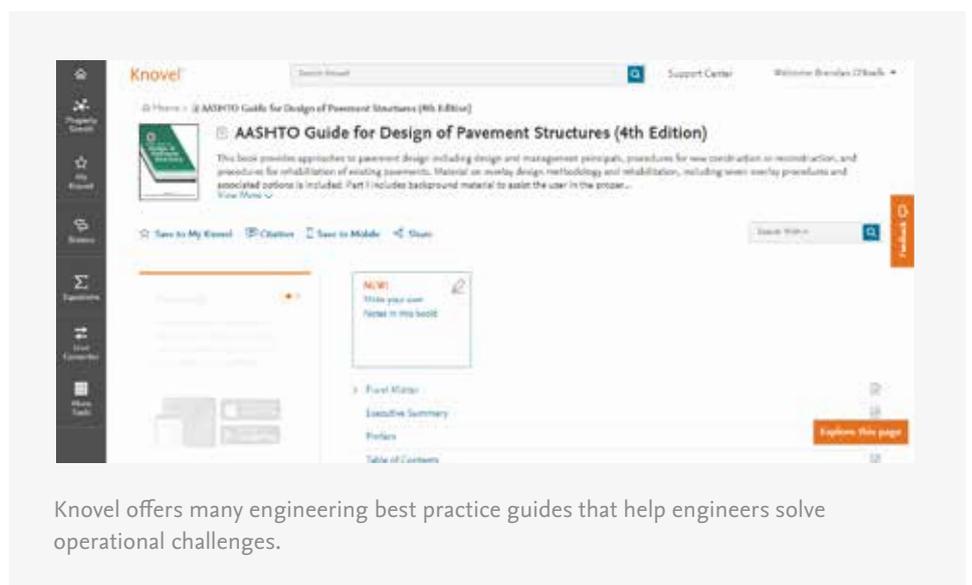
Using these formulas, the engineer discovered that the thickness of the top-layer asphalt could be decreased from 120mm to 50mm without compromising the overall functionality of the roadway.

### Business Impact

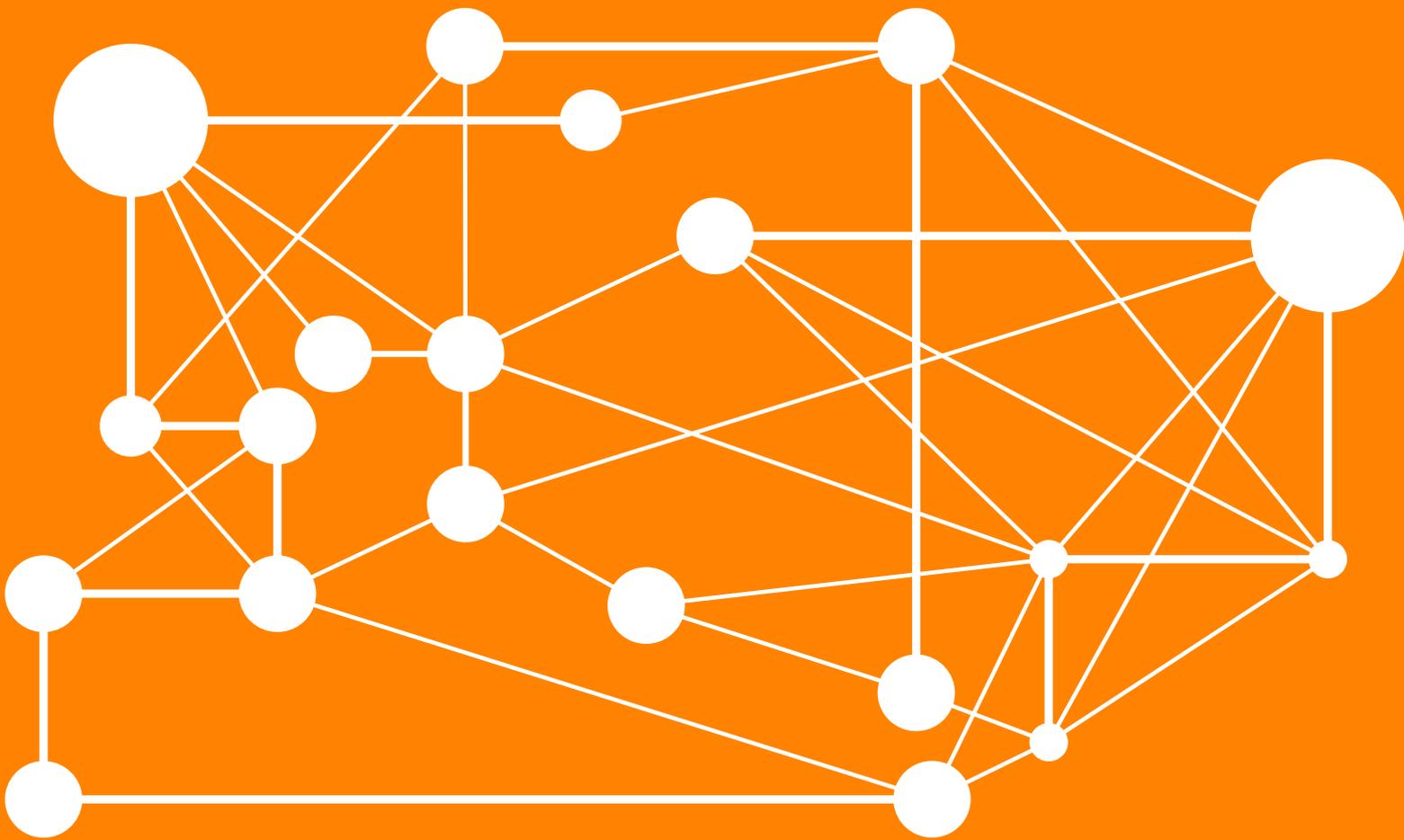
Knovel's search and browse functions enabled Smithson to find foundational knowledge and identify relevant best practices to solve his cost-saving challenge. It also provided an interactive homograph and other formulas that resulted in the discovery of crucial data insights. By offering a graphical way to calculate the roadway's Structural Number, the homograph saved the engineer several days of research and numerical equation solving.

The client agreed to the engineer's proposed technical change of reducing the thickness of the roadway's top layer to 50 mm. By using less asphalt than originally planned, Smithson's company was able to save the client the cost of more than 1,100 cubic meters of asphalt, resulting in \$180,000 in savings.

By offering both the foundational knowledge Smithson needed and the data essential to solving specific problems, Knovel provided the engineer a complete solution to assess the viability of his proposed design change and to calculate the change's impact on outcome quality.



Knovel offers many engineering best practice guides that help engineers solve operational challenges.



## Knovel

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