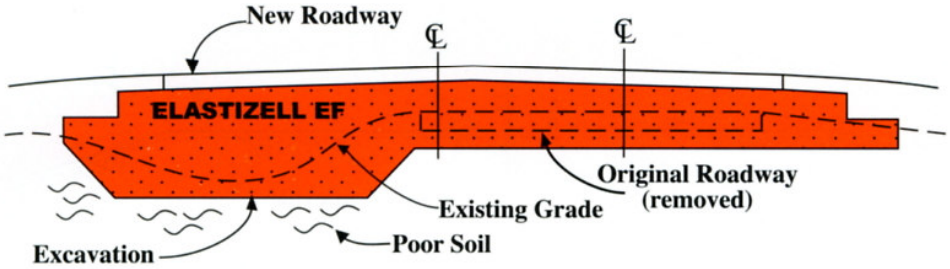
ELASTIZELL EF (Engineered Fill)

RESEARCH REPORT — *Geotechnical Applications*

ROADWAY FILLS

Many two lane roads in the Midwest have raised road beds with sides sloping down to soils that are rich fo farming but poor as a future roadway base. When these roads are widened, it is necessary to accommodat these poor soils under the widened road and shoulder. **Elastizell EF** provides an ideal subbase for a widened roadway over these poor soils.



PROBLEM:

Long term settlement of a roadway over poor soil requires regular maintenance. Adding more asphalt to level the roadway is a temporary treatment that causes additional settlement. Just maintenance is not a permanent solution to this site condition.

SOLUTION:

Removing the very thick asphalt roadway section and installing **Elastizell EF** may unload the soil by mo than 200 psf. These soils have been surcharged by the original roadway and subsequent corrective layers asphalt. Removing existing material and replacing it with the much lighter **Elastizell EF** subbase reduce future settlements.

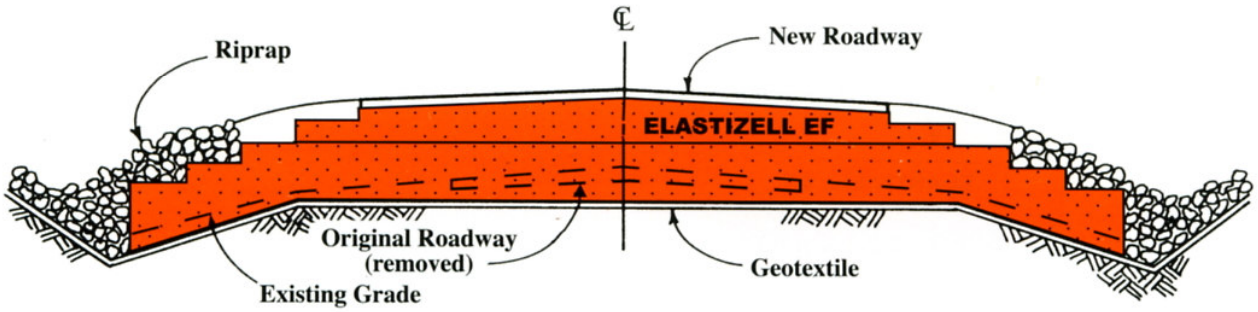
CASE HISTORY

Project:	Indian Boundary Road
Location:	Chesterton, IN
Completed:	August, 1990

Indian Boundary Road in Chesterton, IN was a narrow winding road as it approached a bridge. When traffic volume increased, it was decided to widen and straighten this road. Since the shoulders dropped off sharply from the original road, **Elastizell EF** was selected to reduce the load over this poor soil, to raise the grade, and to widen the roadway without overloading the shoulders.

Before

Elastizell EF with a "saddlebag" configuration is thicker at the edges (shoulders) to lighten up loads as the existing ditches are brought up to elevation for the widened road. The new portion of the shoulders have a stepped configuration of **Elastizell EF** to reduce the dead load.



After

ADVANTAGES

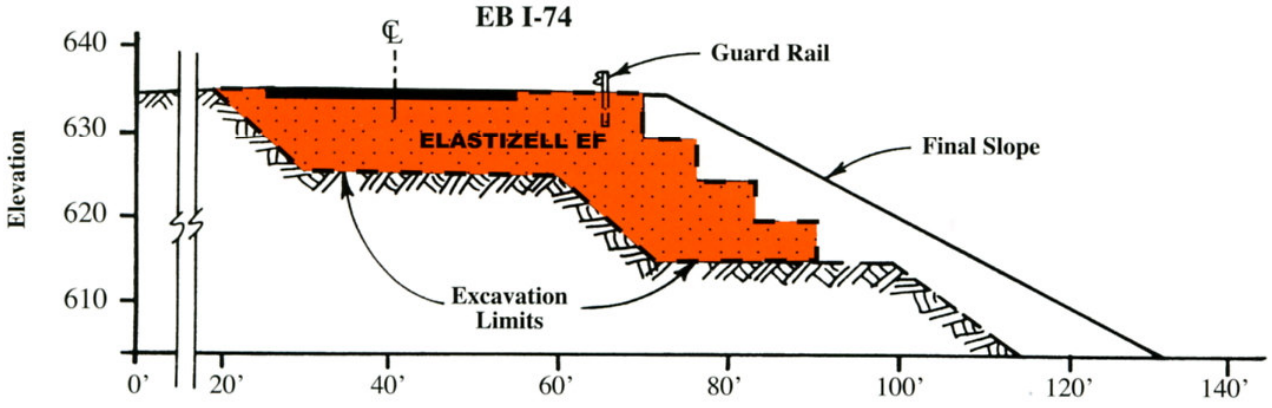
- **Elastizell EF** provides load reduction for applications over culverts and poor soils. It permits increased approach elevations for raised structures.

- Because of its low density, **Elastizell EF** requires less load balancing excavation then heavier fill materials. (see back page)

Project:	I-74 west of Cincinnati
Location:	Hamilton County, OH
Completed:	August, 1986

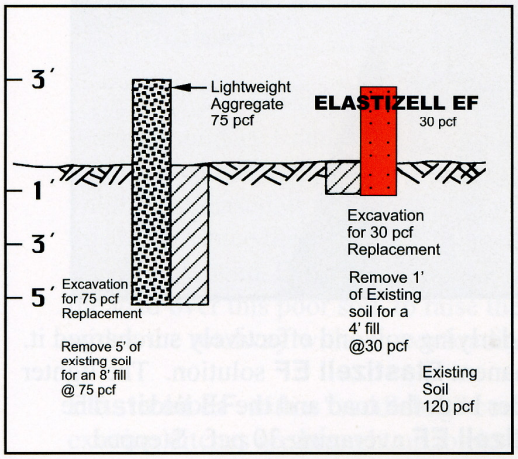
The renovation of I-74, which had substantial side slope movement, utilized a terraced **Elastizell EF** solution to reduce the load on the poor soil. Settlements were so significant that the eastbound portion of the Interstate was closed.

Maintenance corrections merely added asphalt (weight) to the underlying soil and effectively surcharged it. This continuing maintenance headache was solved with the permanent **Elastizell EF** solution. The lighter **Elastizell EF** significantly reduced the dead load at this site under both the road and the shoulder. The asphalt road and overlays (120 pcf) were replaced with the **Elastizell EF** averaging 30 pcf. Stepped **Elastizell EF** controlled the dead weight, volume and cost of this renovation.



- **Elastizell EF** is a proven and permanent solution that does not endanger the environment.
- **Elastizell EF** is easily excavated for future access to underlying utilities.
- **Elastizell EF** allows for widening of roadways with steep shoulders. It offers long term savings with no maintenance.
- **Elastizell EF** provides a cost effective and time saving solution.

Elastizell EF vs. Lightweight Aggregate



Load Balancing Method

Excavate:
1' roadway @ 120 pcf = 120 pcf

1' existing soil @ 120 pcf = 120 pcf

2' 240 pcf

Replace:
1' roadway @ 120 pcf = 120 pcf

2' Class IV EF @ 36 pcf = 72 pcf

2' Class II EF @ 24 pcf = 48 pcf

5' = 240 pcf

Note: 3' gain in elevation with no gain in dead load

Comparison of Fill Material Densities

Elastizell EF Class I	18-24 pcf
Elastizell EF Class II	24-30 pcf
Elastizell EF Class III	30-36 pcf
Elastizell EF Class IV	36-42 pcf
Water	62.4 pcf
Lightweight Aggregates	60-90 pcf
CLSM Fly Ash Slurries	90-120 pcf
Soils	120 pcf
Controlled Density Fills (CDF)	125 pcf
Aggregates	125 pcf
Lean Concrete	145 pcf

EXAMPLE SOLUTION

IA DOT Project - US 63 over Sugar Creek - Clay Fill Calculation using Load balancing

Volume calculations based on load balancing depth calculations - width of fill assumes full width under EF.

Station	Estimated Bottom of Excavation (m)	Estimated Top of Clay Fill (m)	Depth of Clay Fill (m)	Overall width of Clay Fill (m)	Width at top of Clay Fill (m)	Cross Sectional Area (m2)
177+20	209	214.33	5.33	110	110	586.3
177+40	209	211.67	2.67	118	118	315.06
177+60	207	209	2	124	124	248
177+70	206	209	3	126	126	378
177+82	206	208.33	2.33	130	130	302.9
178+25	206	208.33	2.33	130	130	302.9
BRIDGE						
178+80	210	217	7	90	90	630
179+00	214	222.5	8.5	109	109	926.5
179+20	217	221	4	92	92	368

Station From	Station To:	Cross Section Area 1 (m2)	Cross Section Area 2 (m2)	Distance between Stations (m)	Est. Volume of fill (m3)	
177+20	177+40	586.3	315.06	20	9013.6	
177+40	177+60	315.06	248	20	5630.6	42,154 m3 this side
177+60	177+70	248	378	10	3130	
177+70	177+82	378	302.9	12	4085.4	
177+82	178+25	302.9	302.9	67	20294.3	
BRIDGE						
178+80	179+00	630	926.5	20	15565	28,510 m3 this side
179+00	179+20	926.5	368	20	12945	
				Total Estimated Volume:	**70,664**	**cubic meters**
					92,425	**cubic yards**

Please contact the Elastizell Corporation of America for additional specific design values and more detailed specifications.

Elastizell Corporation of America

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