# ELASTIZELL EF (Engineered Fill)

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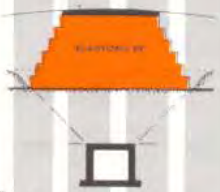


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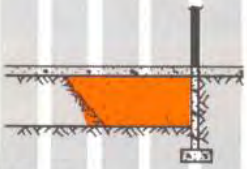

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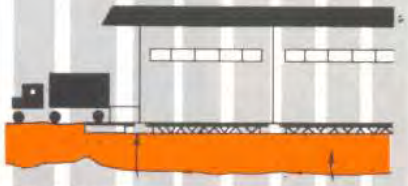

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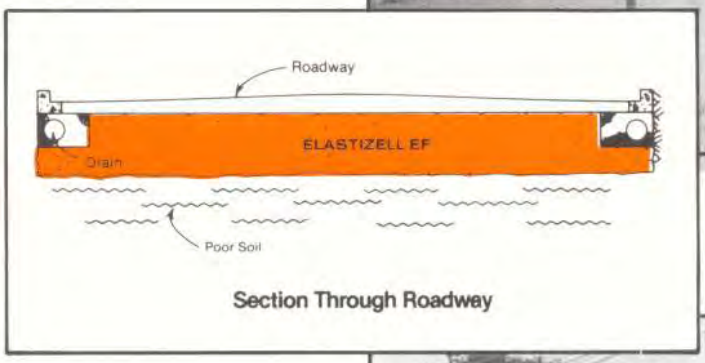
*the elastizell advantage*

# ROADWAY FILLS

## *Elastizell EF Serves as Base for Roadway Over Peat Deposit.*

*Two lanes of roadway are being repaired with* ***ELASTIZELL EF*** *while traffic is maintained on the other side.*




**Section Through Roadway**

*Aggregate base spread on an intersection cast with 2 feet of* ***ELASTIZELL EF.***

*Edge forming for the second 1 foot lift of* ***ELASTIZELL EF.***

*A view along the roadway reconstruction showing depth of cut,* ***ELASTIZELL EF****, aggregate base, asphalt road surface, and temporary traffic barriers.*

## PROBLEM

Long term settlement of an asphalt roadway over a peat deposit required regular maintenance. Adding more asphalt to level the roadway was a temporary solution which caused additional settlement of the peat.

## SOLUTION

Removing the very thick asphalt roadway section and installing **ELASTIZELL EF** will unload the peat by about 160 psf. Since the peat deposit was surcharged by the original asphalt roadway and subsequent corrective layers of asphalt, the much lighter roadway subbase of **ELASTIZELL EF** will reduce this settlement problem.

## DISCUSSION

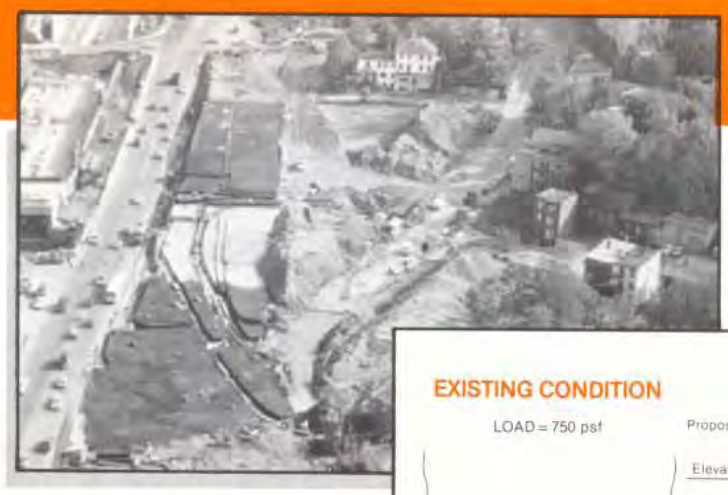
Because of the high cost of land, marginal land is often all that remains for highway construction. This land may be either a sanitary landfill or soil with a very low bearing capacity.

In the pictures, **ELASTIZELL EF** was cast over partially excavated peat to reduce the load of the fill, to distribute the highway loading, and to provide a solid base for the compacted fill and flexible asphalt pavement.

## ADVANTAGES

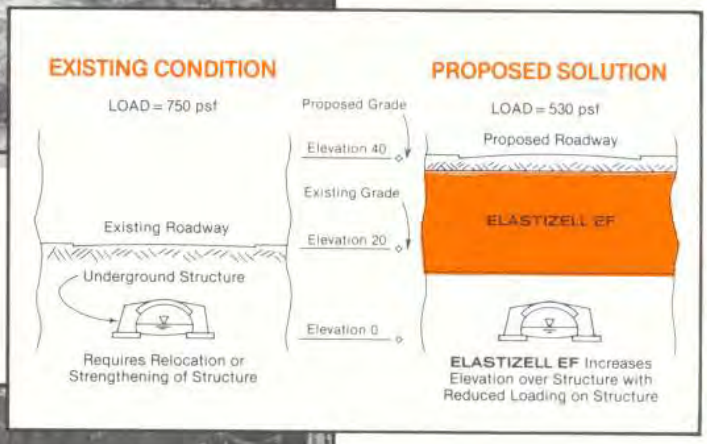
- **ELASTIZELL EF** *is the only material that could be used for a solution such as this.*
- *Halts a costly and continuing maintenance problem.*
- *Since it is pumped into place and does not require compaction,* **ELASTIZELL EF** *may be placed efficiently in urban areas while maintaining traffic.*
- *Provides a safer roadway by eliminating the "roller coaster" effect.*

# UNDERGROUND CULVERT STRUCTURES



*An aerial view of the* ***ELASTIZELL EF*** *which raises the roadway base over the underground structure next to the subway on the left.*

## *Elastizell EF Reduces Loading Over an Underground Culvert Structure Unable to Support Additional Loads.*




*The 2 foot lifts of Class II* ***ELASTIZELL EF*** *were designed to reduce the load over the culvert structure.*

## PROBLEM

A roadway grade must be raised to accommodate a new transit system. A portion of the roadway is over an underground culvert structure unable to carry additional loads. How can the increased elevation be achieved at a minimal cost without overloading this structure?

## DISCUSSION

The major concern in this application is what happens to the culvert structure when it is unloaded (by removal of the existing soil) and then slowly reloaded to 2/3 of the original load (when the **ELASTIZELL EF** is cast).

The resulting **ELASTIZELL EF** approach is much less costly and less time consuming than special underground foundation and structure work designed to carry the additional loads of a heavier fill.

## SOLUTION

In order to increase the overall depth of fill over the underground culvert structure, it is necessary to first remove a portion of the existing soil. In this case, it was decided to remove the existing soil down to just above the ground water table. The existing soil removed averaged 8 feet in depth.

Then Class II **ELASTIZELL EF** is cast in thicknesses ranging from 8 feet to 23 feet along the 600 foot length of the problem area. After the 23 foot thickness of the **ELASTIZELL EF** is placed, the load on the culvert structure is only about 2/3 of the original load from the original 8 feet of soil.

The new roadway can then be placed on the **ELASTIZELL EF**.

## ADVANTAGES

- ***The simplest solution is a load reducing* ELASTIZELL EF.**
- ***Alternate solutions would have a high probability of damaging the underground structure.***
- ***The very lightweight, stabilized* ELASTIZELL EF *(25 pcf) permits about a 4:1 ratio of fill depth increase to existing fill removal.***
- ***If this culvert section were to be diverted, reconstructed and then reconnected, delays of 1 to 2 years and excess costs of millions of dollars would result.***


*Specialized and certified equipment is required for these large* ***ELASTIZELL EF*** *installations.*

# WEIGHT REDUCING FILLS

## *Elastizell EF Dead Load Over Underground Convention Centers in San Francisco and Edmonton.*

### PROBLEM

For structural considerations, it is necessary to reduce the dead load on fills for underground convention centers.

### SOLUTION

**ELASTIZELL EF** is cast to reduce the dead load by about 75%.

### DISCUSSION

In an underground structure, the control and reduction of dead loads is important. **ELASTIZELL EF** is the most economical way to reduce loads. This usually saves on the design of the structure itself.

### ADVANTAGES

- *A maximum load requirement can be specified.*
- *Savings in the structural design may result from these reduced dead loads.*
- *The* **ELASTIZELL EF** *may be formed (shaped) to virtually any configuration.*

## MOSCONE CONVENTION CENTER

*Moscone Convention Center Ramp, San Francisco, CA.*

*Applicator: Cell-Crete Corp., Hayward, CA.*

## EDMONTON CONVENTION CENTRE

*Jasper Avenue over Edmonton Convention Centre, Edmonton, Alberta, Canada.*

*Applicator: Scolly Enterprises, Ltd.—Edmonton.*

# LANDSCAPING AND PLAZA FILLS

Capitol Plaza in Frankfort, Kentucky.

Copley Place in Boston, Massachusetts.

## *Elastizell EF Permits the Landscaping of a Plaza.*

## PROBLEM

Existing plazas have maximum allowable loads which may preclude landscaping with planters, retaining walls, earth fill, or reflecting pools without exceeding the allowable loading. How can a reflecting pool be re-landscaped without overloading its supporting structure?

## SOLUTION

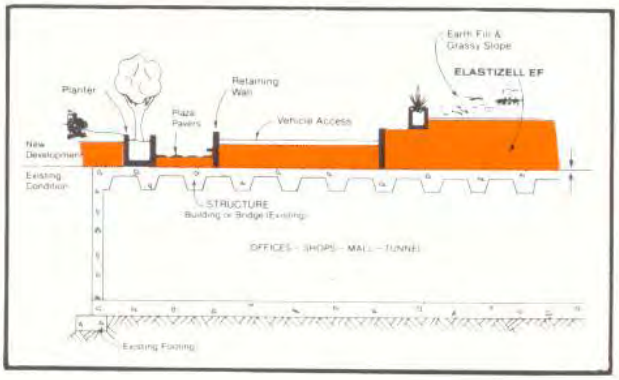
**ELASTIZELL EF** is cast over the waterproofed plaza after the planters and retaining walls have been installed. This greatly reduces the dead load on the plaza structure yet still permits enough load carrying capacity for the earth fill required for grassy slopes and other vegetation.

## DISCUSSION

The renovation of these shopping/office malls is often a more desirable solution than the reconstruction of new facilities. The "new look" can perk up an otherwise drab area and "rekindle" tenant and visitor interest.

The customized fill for this application must be lightweight, strong, permanent and easily placed **ELASTIZELL EF**.

- **ELASTIZELL EF** as a plaza fill reduces the load on bridge spanning the Massachusetts Turnpike in downtown Boston.




## ADVANTAGES

- ***The load reducing* ELASTIZELL EF *is the most obvious solution.***
- **ELASTIZELL EF** ***can easily support equipment needed to create the landscaping.***
- **ELASTIZELL EF's** ***resistance to freeze/thaw cycles and water absorption are important factors in this application.***

# LANDSLIP REPAIR FILLS

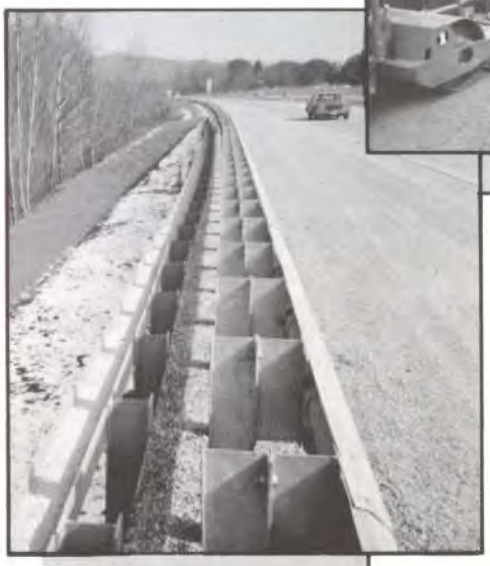
## *Elastizell EF Lightens Slip Plane on Interstate Highway.*

*The slip area has distorted the guardrail. Subsequent asphalt patches increase the load on the slip-prone material.*

*The aerial view shows the slip section of I-64 east of Huntington, WV which was repaired with* ***ELASTIZELL EF.***

***ELASTIZELL EF*** *is placed on the excavated area up to the anchored piles providing a solid, yet extremely lightweight base for the Interstate roadway.*

*A view along the same guardrail line after the slip area was corrected.*



### PROBLEM

How can a slip area be repaired and prevent future slippage on an Interstate roadway?

### SOLUTION

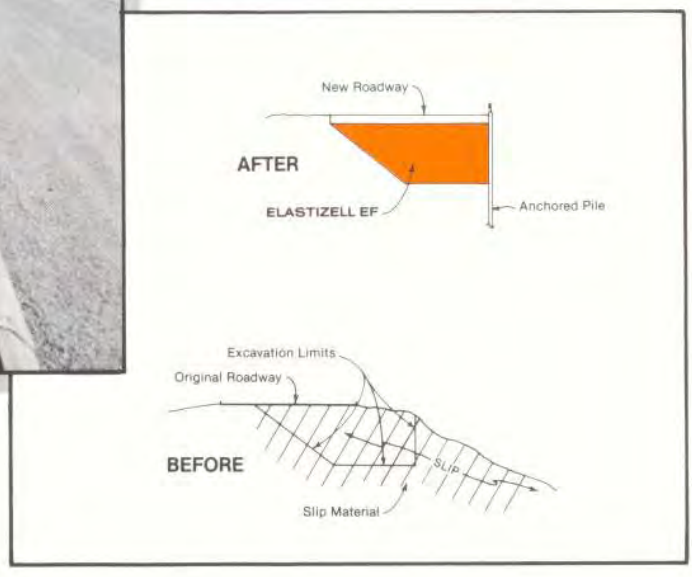
A pile and waler system provides the permanent form and lateral restraint for **ELASTIZELL EF** at the slip area.

### DISCUSSION

Attention must be directed to both the proper anchorage of the pile system and the free water drainage through and around the site.

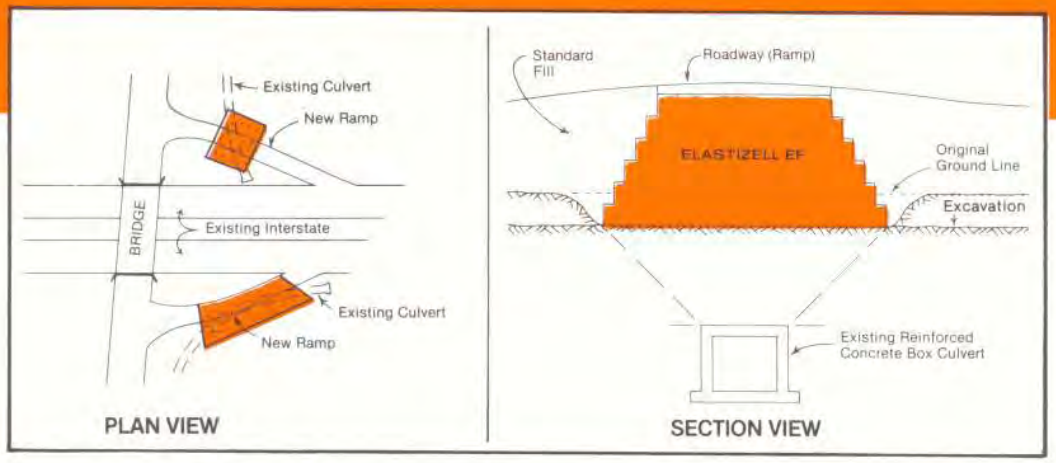
### ADVANTAGES

- **ELASTIZELL EF** *reduces the vertical dead load on the slope.*
- *The* **ELASTIZELL EF** *permits a lighter retaining wall system since it does not exert horizontal forces on the wall.*
- *The tight work area can easily accommodate the* **ELASTIZELL EF** *batching system for fast installation.*



# FILLS OVER CULVERTS

## *Elastizell EF Permits Higher Levee and Embankment Structures Over Poor Soils.*




***ELASTIZELL EF*** *is engineered for load balancing to fit the sloping culvert, the depth of fill over the culvert, and the final ramp elevations.*

***ELASTIZELL EF*** *load balances the fill over an existing culvert to increase the grade without overloading the culvert. This eliminates the need to replace the culvert.*

## DISCUSSION

The **ELASTIZELL EF** solution is much less expensive, faster, and more practical than total excavation, demolition, and reconstruction especially on a limited site such as this one with traffic operating on the Interstate. Drainage runoff at this location will not be interrupted since the box culvert will remain in place and operating during ramp construction. Excavation is also kept to a minimum.

## ADVANTAGES

- *The very light* **ELASTIZELL EF** *permits a 4 to 1 ratio of fill depth increase to existing fill removal by load balancing to avoid overloading the box culvert. This minimizes excavation quantities.*
- *Keeping the box culvert intact with the* **ELASTIZELL EF** *solution permits the continued use of this drainage structure and avoids potential runoff and silt damage if the open cut and demolition solution was selected.*
- *The speed of the* **ELASTIZELL EF** *solution will result in the ramp being opened sooner than if the open cut and demolition solution was followed.*

## PROBLEM

It is necessary to add a two ramp interchange for an Interstate Highway. At this particular location, a deep fill is required for these ramps over existing reinforced concrete box culverts. Since the proposed ramp fill depth would overload the culvert, what is the most economical method to construct these exit/entrance ramps over the existing box culverts?

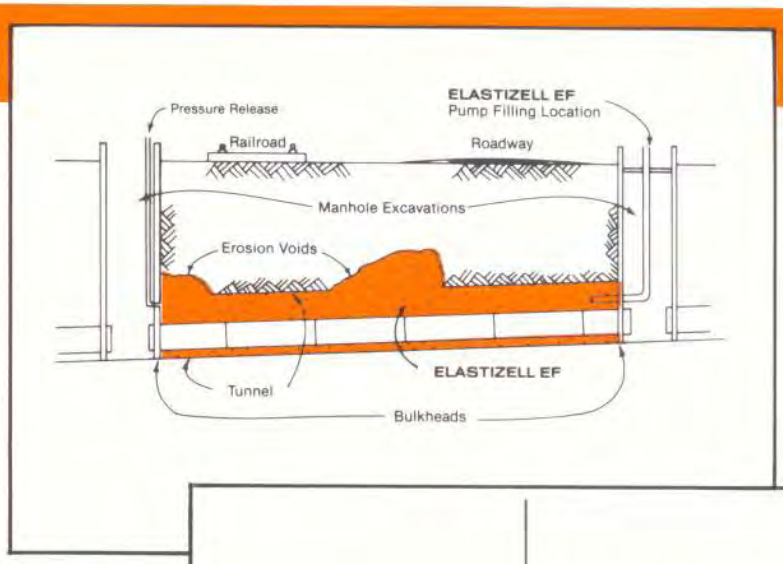
## SOLUTION

The existing fill is very deep over the box culvert at the location where it crosses the proposed ramp. Strengthening the box culvert would require sheeting the excavation around the culvert, excavating a great quantity of fill material, demolishing the box culvert, forming and casting a new culvert, and replacing the fill up to the new ramp height including a great deal of compaction.

After a value engineering study, it was determined that the most economical solution would be to conduct a load-balancing solution with **ELASTIZELL EF**. Excavation quantities were determined at the critical sections so that the necessary quantities of **ELASTIZELL EF** would bring the ramp to the proper grade without overloading the box culvert.

# PIPELINE FILLS

## *Lightweight Elastizell EF Completely and Safely Fills Tunnel Voids, Abandoned Pipelines, and Sliplined Pipe Annular Spaces.*




## PROBLEM

What is an economical method for filling tunnel voids, abandoned pipelines, and sliplined pipe annular spaces?

## SOLUTION

**ELASTIZELL EF** is an excellent fill material for voids created by various methods of pipeline construction.

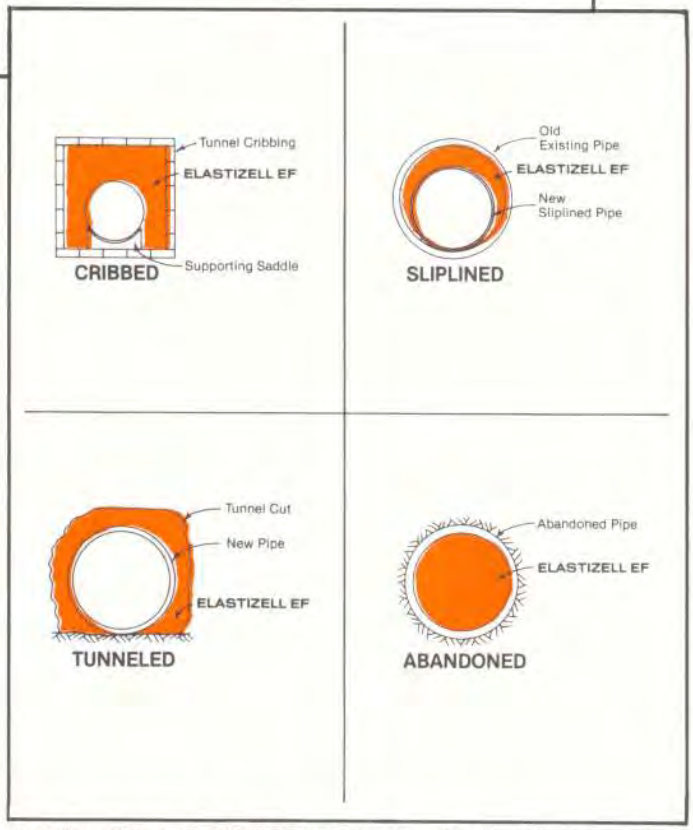
**ELASTIZELL EF** is pumped into place to fill the entire void.

## DISCUSSION

**ELASTIZELL EF** is the most practical solution for this application. The mix design, approved by the Elastizell Corporation complies with state and municipal specifications.

## ADVANTAGES

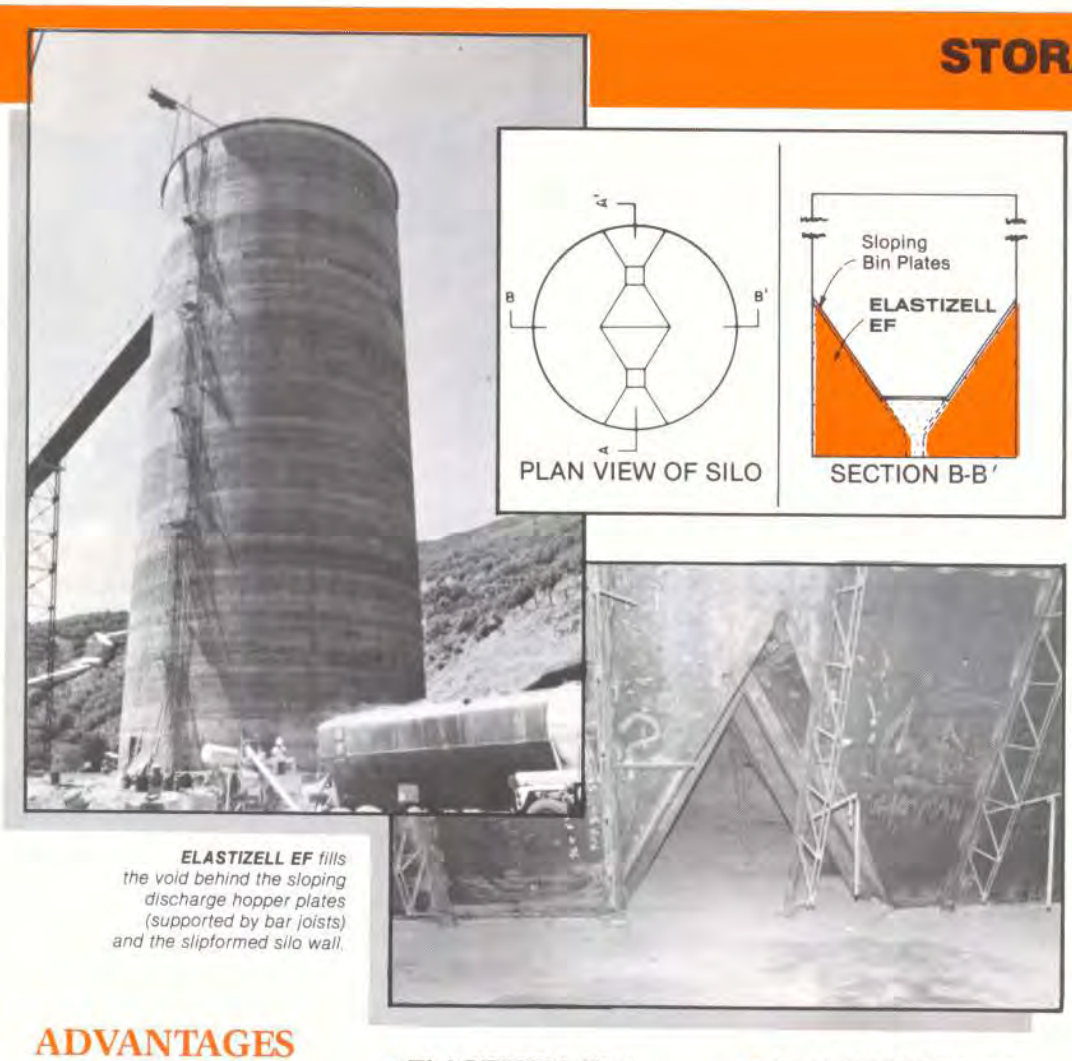
- *Since no workers are in the excavation, it is a safe method for filling voids.*
- *Complete filling of the void is ascertained by the known volumes and density of the* **ELASTIZELL EF** *placed.*
- *The speed of installation results in this being an economical and competitive method of filling voids.*
- *Flowability of up to 600 feet has been obtained.*




*High flowability of* **ELASTIZELL EF** *completely fills voids from various types of pipe line construction.* **ELASTIZELL EF** *will not overload poor soils and is much stronger than other backfill materials.*

*Specialized batching, mixing and placing equipment is required for the proper installation of* ***ELASTIZELL EF*** *for pipeline fill voids.*

# STORAGE SILO FILLS




***ELASTIZELL EF** fills the void behind the sloping discharge hopper plates (supported by bar joists) and the slipformed silo wall.*

## *Elastizell EF Behind Sloping Hopper Plates of a Coal Storage Silo Reduces Foundation Loads.*

## PROBLEM

Storage silos usually require a stable fill material for uniform support behind the sloping hopper plates. If a lightweight fill material is considered in the original silo design, significant cost savings result.

## SOLUTION

**ELASTIZELL EF** is a lightweight and economical material to cast behind the sloping bin plates of silo storage structures.

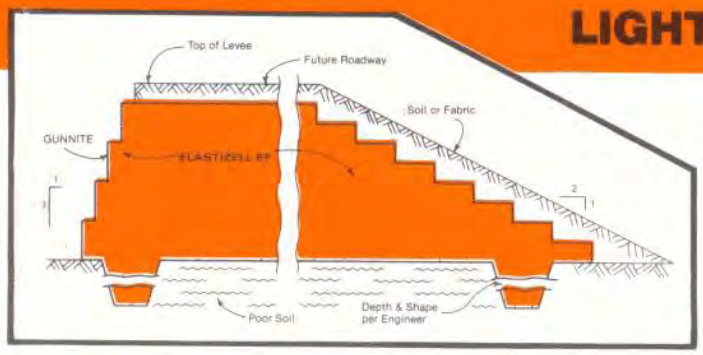
The lightweight **ELASTIZELL EF** permits substantial savings in the silo structure and foundation design due to the reduced seismic forces and dead load.

**ELASTIZELL EF** is a more economical material to install than lean concrete.

## ADVANTAGES

- *In seismic areas, a significant savings will result in the slipformed or cast in place silo wall design due to the reduced mass of the fill.*
- **ELASTIZELL EF** *is faster and safer to install than the heavier lean concrete.*
- **ELASTIZELL EF** *will reflect a savings in wall, foundation, and floor slab structural requirements.*
- *An* **ELASTIZELL EF** *may be less costly than lean concrete.*
- **ELASTIZELL EF** *should be considered as one component of an economical storage silo system.*

# LIGHTWEIGHT LEVEE STRUCTURES




## *Elastizell EF Permits Higher Levee Structures Over Poor Soils.*

## PROBLEM

In low bearing capacity soils, levee construction is difficult due to the fact that embankments made from normal weight fills will settle due to their excessive weight.

## SOLUTION

Levees cast from **ELASTIZELL EF** will minimize settlements and reduce maintenance requirements.

The permeability of levee materials must be known by the engineer for proper design.

## ADVANTAGES

- *The levee shape and weight can be customized for specific applications and soil bearing capacities.*
- *A greater variety of cross sectional profiles may be utilized with* **ELASTIZELL EF** *than with standard fill materials.*
- *Higher embankments may be constructed with* **ELASTIZELL EF** *than with normal weight fill materials.*

# BRIDGE REHABILITATION

## *Elastizell EF and Corrugated Steel Culvert Combine in a Non-Disruptive Solution for Upgrading a Structurally Deficient Bridge.*

*New corrugated steel culvert end walls are placed through the deteriorated bridge.*

*Placing* ***ELASTIZELL EF*** *around culvert end wall structure completely filling the void under the old bridge.*

## PROBLEM

A bridge on a federal highway over a small creek has deteriorated to the point where it must be replaced.

## SOLUTION

A corrugated, steel culvert is placed inside the bridge opening, culvert end walls are cast, and the entire void is encased with Class III **ELASTIZELL EF** such that the original bridge is fully supported.

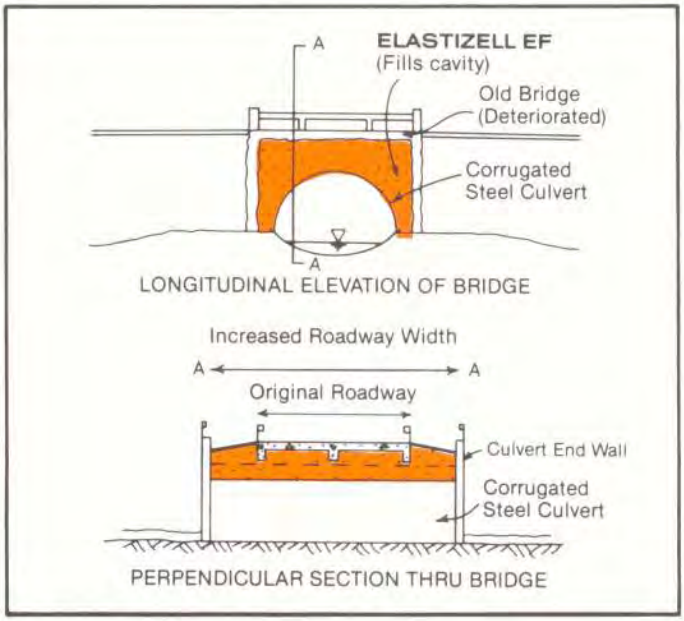
## DISCUSSION

A great many bridges on federal, state, and county roads are rated structurally deficient for the vehicle loads on them.

A quick, non-disruptive and cost-efficient solution is needed for this very serious and extensive problem.

## ADVANTAGES

- *Traffic is not disrupted—neither detoured nor re-aligned.*
- *This is a fast and cost-effective solution with no demolition required.*
- *The bridge is brought back up to its original vehicle load standard.*
- *An extended end wall facilitates future widening of the bridge when the roadway is upgraded.*
- *This solution eliminates the cost and temporary construction of bypass roads and structures during the construction period.*



# WEIGHT REDUCING FILLS

## *Elastizell EF Raises Grade 13 Feet for a Railroad Base Over Poor Soil Without Disturbing Existing Bridge Piers.*

***ELASTIZELL EF** is placed within two rows of precast containment panels — 6' wide, 6.5' high, 4" thick.*

*Raising the grade 13 feet, the **ELASTIZELL EF** is located over poor soil between existing bridge piers.*

## BUILDINGS

### ADVANTAGES

- *There is no need to rehabilitate nor strengthen the existing structure (pier).*
- *Because* **ELASTIZELL EF** *exerts no lateral pressure once it sets, only a 4" thin precast concrete panel is required to contain the fill.*
- *The containment wall system reduces the volume of* **ELASTIZELL EF** *required in this weight sensitive area.*
- *The* **ELASTIZELL EF** *provides a solid base for the railroad track, ties, ballast and subgrade.*

### DISCUSSION

**ELASTIZELL EF** permits the necessary modification of the railroad location. It eliminates potential structural problems and the need for a special solution for the existing bridge pier.

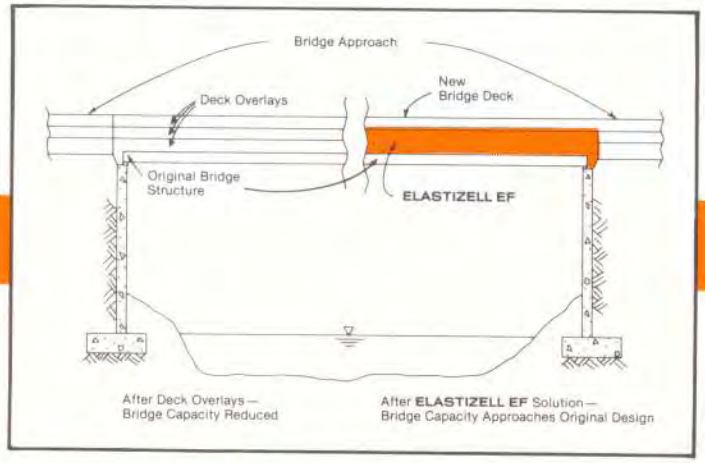
These are important considerations in renovation and reconstruction around our existing urban infrastructure. A simple, light, and effective solution such as this satisfies all areas of concern.

### PROBLEM

It is necessary to raise a railroad grade 13 feet under an existing bridge. A heavy, standard fill material will cause lateral movement of the existing bridge piers.

### SOLUTION

Class II **ELASTIZELL EF** is cast between thin precast walls which avoids stair-stepping the fill laterally and minimizes the volume required. The minimum volume of **ELASTIZELL EF** will not cause additional bridge pier movement.




## BRIDGES

### ADVANTAGES

- *It is more economical to rehabilitate a bridge in this manner than to tear it down and build a new bridge.*
- **ELASTIZELL EF** *may permit the continued use of a bridge without costly approach pavement work.*
- *This rehabilitation work can often proceed while traffic is maintained on the bridge.*

### SOLUTION

Remove the deck overlays down to the original bridge deck. Cast a Class IV **ELASTIZELL EF** to the depth such that when the wearing surface is placed, it will be level with the approach pavement. Calculate the new live load rating for the bridge.

### PROBLEM

As bridge decks are resurfaced after many years of service, the increased dead load results in a reduced live load rating for the bridge. How can the bridge load rating be increased?

# REDUCING LATERAL FORCES

## *Elastizell EF Significantly Reduces the Lateral Forces and Bending Moments Against Walls.*

### PROBLEM

Existing retaining walls are often distressed due to greater than anticipated lateral loads from saturated backfills and clogged drainage systems.

### SOLUTION

An existing distressed retaining wall may be best repaired by removing all or a portion of the existing backfill material, checking the drainage system, and casting **ELASTIZELL EF** to the proper elevation.

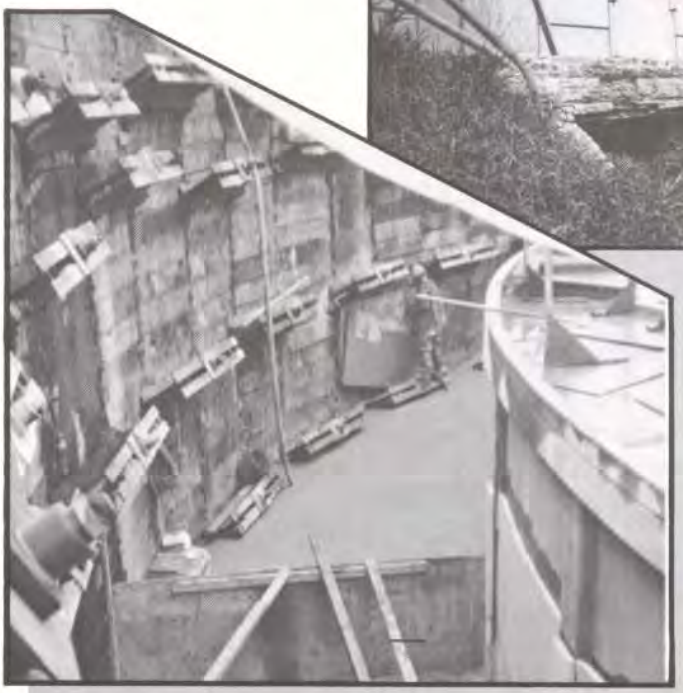
### DISCUSSION

The retaining wall problem may be a very serious matter in many cases, often extending to more extensive structural considerations such as other portions of buildings, roadways, life safety, etc. If the retaining wall is still in fairly good condition, repair may involve only some earthwork, correction of the drainage system, minor forming followed by casting **ELASTIZELL EF** behind the wall.

***ELASTIZELL EF*** *reduces load over culvert and is used in conjunction with earth retaining wall.*

### ADVANTAGES

- *Conventional retaining walls may be redesigned using reduced lateral loading when combined with an* **ELASTIZELL EF** *backfill and good drainage.*
- *Major structural repairs may not be required with the* **ELASTIZELL EF.**
- *This is a fast, economical solution.*

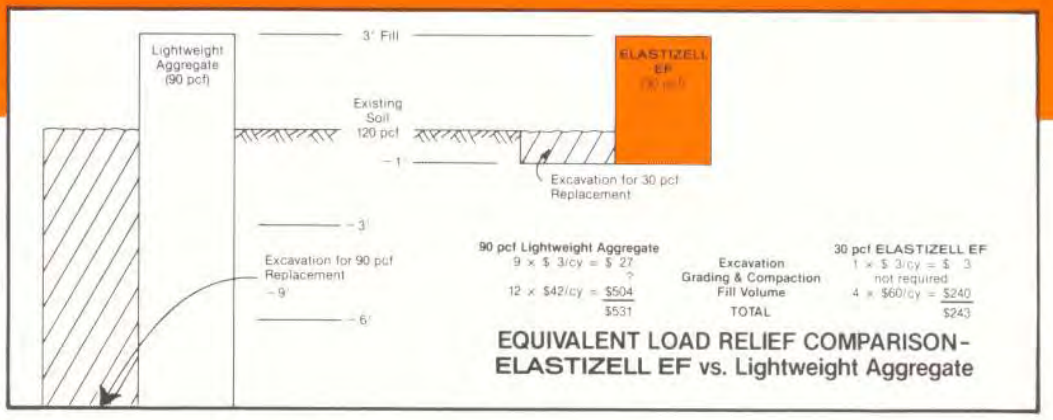


***ELASTIZELL EF*** *fills space between tied back wall and partially buried water tank eliminating uneven pressures on tank walls.*

- *Conventional backfill materials may be too heavy for these corrections.*
- **ELASTIZELL EF** *does not require compaction. This is important in confined work areas where proper compaction is not accessable.*

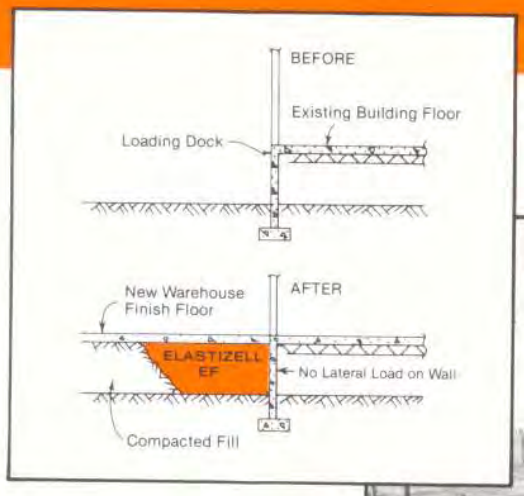
# LOAD BALANCING

**Load balancing** is a technique whereby heavy existing materials are removed so that a greater elevation can be attained with **ELASTIZELL EF** without overloading the original site or structure.

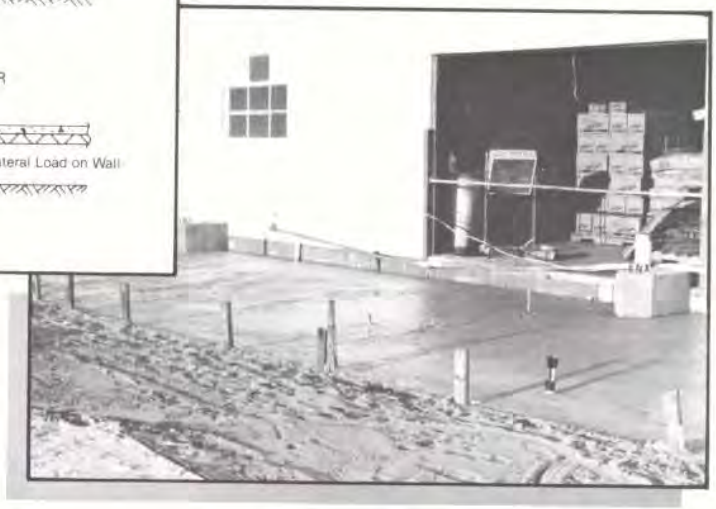



EQUIVALENT LOAD RELIEF COMPARISON-
ELASTIZELL EF vs. Lightweight Aggregate

# FILLS AT EXISTING BUILDINGS




*Final lift of* ***ELASTIZELL EF*** *ready for the finish floor slab.*



## *Elastizell EF Reduces Load on Building Wall at Building Addition*

## PROBLEM

It is necessary to raise the grade at a loading dock to add on to an existing building. The existing soil and building wall cannot tolerate the heavy dead weight of a standard fill material.

## SOLUTION

A 4 foot thickness of Class III **ELASTIZELL EF** is light enough for the poor soil conditions and exerts minimal lateral forces on the existing building wall. It also provides a solid base for the warehouse floor.

## ADVANTAGES

- **ELASTIZELL EF** *does not require compaction and is superior to compacted fills which oftentimes are not properly compacted.*
- *This is a permanent solution for this situation.*

## DISCUSSION

Many businesses find it more cost-effective to expand their existing facilities rather than build new ones. Since these may often be older buildings, renovation and expansion may potentially place loads on these buildings that they were not designed to handle.

Some of these loads such as lateral forces against walls and vertical loads from standard fills may be drastically reduced by utilizing **ELASTIZELL EF**

# EARTH SHELTERED CONSTRUCTION

*This illustrates a location where* ***ELASTIZELL EF*** *could be placed against the existing building wall to reduce the bending moment in the wall and create an insulating berm next to the building.*

**ELASTIZELL EF** has many varied applications for earth sheltered and underground construction. These start with a footing pad (or footing) to distribute the loads of the structure over a larger area. An insulating fill for the floor slab keeps the structure dry and warm.

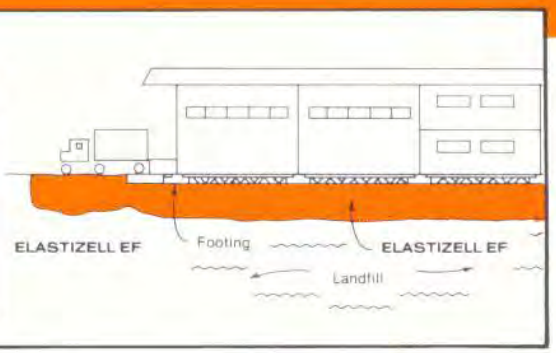
Wall berms or fills behind walls of **ELASTIZELL EF** help insulate the structure, but more importantly, they will substantially reduce the bending moments in the walls resulting in structure savings. The "roof" of an underground structure would utilize the **ELASTIZELL EF** as a sloping drainage fill to help direct water away from the structure as well as insulate it. By replacing a large portion of the earth fill, **ELASTIZELL EF** will substantially reduce dead loads on the roof's structural members further saving on structure costs. By load balancing, an earth topping will still support vegetation.

- *Insulation*
- *Reduced Loads*
- *Berms & Wall Fills*
- *Drainage Correction*
- *Energy Saving*
- *Reduce Structural Requirements*

The permanent characteristics of **ELASTIZELL EF** along with its light weight, make it an ideal material for this type of construction.

# LOW DENSITY MAT FOUNDATIONS

## *Elastizell EF Concrete Mat Foundation Permits Feasibility for Conversion of Sanitary Landfill to Building Site.*




### PROBLEM

A marginal building site requires many caissons to support a one story building. This costly solution results in the entire building/foundation/site package being too expensive for an acceptable rate of return to the investor.

### SOLUTION

A low density mat foundation may be an economical solution for supporting "light" buildings over poor soils or sanitary landfills. **ELASTIZELL EF** provides a solid foundation for the building, reduces the unit load on the existing soil, and replaces the costly caissons normally used on these sites.

A reinforcing steel network may be required in special instances. Once the **ELASTIZELL EF** mat foundation is cast, a compacted fill is placed over it upon which the footings, column pads, and building services are constructed in the normal manner.

### DISCUSSION

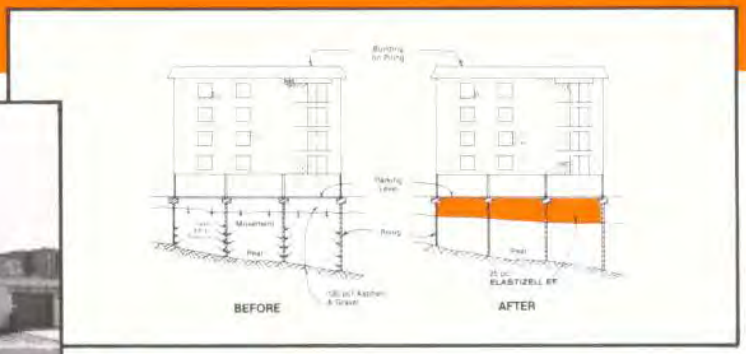
Standard ACI formulas for lightweight concrete with appropriate correction factors may be used for analysis. A reasonable concrete strength and density must be selected for these special applications.

### ADVANTAGES

- *A practical solution for the economic recovery of marginal land for building sites.*
- *This may be an alternate solution to conventional foundation designs for landfill sites.*
- *The insulation characteristics of the* **ELASTIZELL EF** *may have an application for mat foundations in permafrost areas.*

# WEIGHT REDUCING FILLS

## *Elastizell EF Solves Sinking Parking Area Problem Over Marshy Soils.*




### PROBLEM

The parking area under a building sited on piles in a peat deposit sinks 3 to 4 feet. This movement is accelerated by placing heavy gravel in the parking area to raise the parking elevation back to that of the building which does not move. How can this settlement be halted?

### SOLUTION

Excavate the heavy asphalt and gravel in the parking area and replace with **ELASTIZELL EF**.

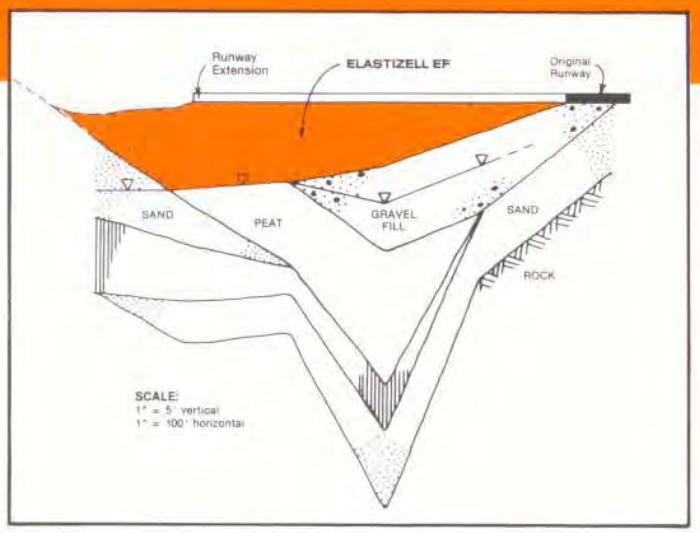
### DISCUSSION

If the peat has gone into primary consolidation, removing the heavy fill (120 pcf) and replacing it with an equal volume of **ELASTIZELL EF** (25 pcf) will unload the peat and greatly reduce any further settlements.

### ADVANTAGES

- *This is the only reasonable solution since the piling and grade beams cannot carry the parking area loads and it is impossible to drill or drive additional piles.*
- *Once the existing parking area is excavated, the* **ELASTIZELL EF** *can be installed quickly.*

# FILLS OVER MARSHY LAND




## ADVANTAGES

- **ELASTIZELL EF** *is light enough for these applications, yet it can still distribute gravity and traffic loads to these marshy areas.*
- *This increases the value of previously unusable land.*
- *Costly maintenance procedures would be substantially reduced in the case of embankments that cannot permit continual settlement due to their heavy weight.*

## SOLUTION

**ELASTIZELL EF** concrete stabilized fill will not overload the peat deposit when the runway extension site is raised. The runway structure can then be constructed directly on the **ELASTIZELL EF**.

## DISCUSSION

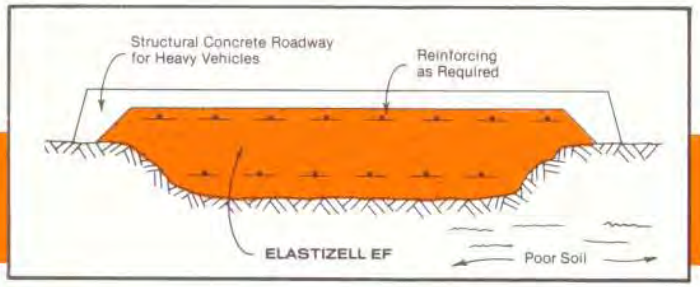
Whenever these marsh sites are encountered, they should be cleared and grubbed. The high, low and mean water table levels must be noted for dewatering determinations and buoyancy calculations. Special casting techniques may be necessary depending upon the particular site characteristics.

Roadway widening, runway lengthening, and embankment heightening would be the major applications for stabilized **ELASTIZELL EF** over marshy soils.

***Elastizell EF Permits Embankments, Roadways, and Runways to be Heightened, Widened, and Lengthened Over Marshy Soils.***

## PROBLEM

An underlying layer of peat has prevented the raising of a runway extension by normal construction methods which are to fill and compact. How can a runway extension site be raised through a marshy area?




# LIGHTWEIGHT STRUCTURAL ROADWAY BASES

## ADVANTAGES

- *Reinforced* **ELASTIZELL EF** *will distribute the loads from various loading configurations such that existing bearing pressures are not exceeded. The* **ELASTIZELL EF** *acts like a deep, lightweight beam.*
- *This solution appears to be significantly less costly than the "land bridge" contemplated.*

## DISCUSSION

A geotechnical fabric/gravel solution did not work well due to the fact that under these extreme loads, the gravel was unable to distribute these loads to the poor soil underneath. Another potential solution would be to construct a land structure on piles, but this is extremely expensive.

## PROBLEM

When heavy equipment carries 70 ton loads over a roadway built with fabric and gravel over poor soil, it leaves the roadway rutted and requires excessive maintenance.

## SOLUTION

A reinforced, lightweight **ELASTIZELL EF** acts as a base for structural concrete working slab spreading these excessive loads at this poor site.

**Lightweight Elastizell EF Helps Carry 70 Ton Loads Over Low Bearing Capacity Soil.**

# Short Form SPECIFICATIONS

## 1 SCOPE OF WORK:

The certified **ELASTIZELL EF** applicator shall furnish labor, materials, equipment, and supervision for the installation of the **ELASTIZELL EF** in accordance with the Drawings and Specifications.

## SECTION 02223: ENGINEERED FILLS

### *Comparison of Maximum Fill Material Densities*

| | |
|---|---|
| **ELASTIZELL EF** | |
| Class I | 24 pcf |
| Class II | 30 pcf |
| Class III | 36 pcf |
| Class IV | 42 pcf |
| Water | 62.4 pcf |
| Lightweight Aggregates | 60-90 pcf |
| Soils | 120 pcf |
| Aggregates | 125 pcf |
| Lean Concrete | 145 pcf |

## 2 MATERIALS:

.1 **ELASTIZELL EF shall be supplied by the Elastizell Corporation of America and installed by a certified ELASTIZELL EF applicator.** ELASTIZELL concentrate may be tested as described in ASTM C796.

.2 PORTLAND CEMENT shall comply with ASTM C150, Type I, II, III or Block Cement. Pozzolins and other cementitious materials may be used when specifically approved by the Elastizell Corporation.

.3 MIXING WATER shall be potable and free of deleterious amounts of acids, alkali, salts, oils, and organic materials which would adversely affect the setting or strength of the concrete.

.4 ADMIXTURES for water reducing, accelerating, etc. may be used with **ELASTIZELL EF** in accordance with the manufacturer's recommendations as applicable for unusual job conditions.

## 3 MIX DESIGN:

**Mix design shall be in accordance with the Elastizell Corporation's recommendations** for a cast density (at point of placement) of _____pcf ± _____pcf with a compressive strength of _____psi at 28 days.

## 4 MIXING AND PLACING:

**ELASTIZELL EF** shall be job site batched, mixed, and placed **with specialized equipment certified by the Elastizell Corporation.** Slurry coats, two-density casting and multi-layer casting are acceptable methods of installation.

## 5 TESTING:

Four (4) test specimens shall be taken at point of placement. Class IV, V, and VI specimens shall be tested in accordance with ASTM C495 except that test specimens shall not be oven dried prior to compressive testing. (3" × 6" cylinders are recommended). **Class I, II, and III ELASTIZELL EF require special handling and testing techniques. Contact the Elastizell Corporation for these procedures.**

## 6 SPECIAL CONSTRUCTION METHODS:

Installation procedures may vary according to the particular design requirements. **Contact the Elastizell Corporation of America for design assistance and application recommendations.**

# BASIC PHYSICAL PROPERTIES

## ELASTIZELL EF (Engineered Fills)

**Greater values may be obtained if required per Elastizell Corporation design.*

| CLASS | MAXIMUM CAST DENSITY pcf | MINIMUM COMPRESSIVE STRENGTH psi* | ULTIMATE BEARING CAPACITY Tons/sf |
|---|---|---|---|
| I | 24 | 10 | 0.7 |
| II | 30 | 40 | 2.9 |
| III | 36 | 80 | 5.8 |
| IV | 42 | 120 | 8.6 |
| V | 50 | 160 | 11.5 |
| VI | 80 | 300 | 21.6 |