Case Studies

Albany, Western Australia

The Project
Units with 16 and 20 cells
Diameter of a cell: 12m
Height of a cell: 33m

The Problem
Large vertical cracks inside of cell walls

The Sika® Solution
- Injection of cracks with Sika System Solution
- Strengthening of cell walls on inside with:

  - SikaWrap®-230 C ca. 16'000m²
  - Sikadur®-330 epoxy adhesive ca. 22'000kg

Silo Santiago de Chile, Chile

The Project
Unit with 10 cells
Diameter of a cell: 6m
Height of a cell: 22m

The Problem
- The silo presented outside cracks in several directions mainly vertical
- Inadequate spacing of reinforcement
- Concrete joints
- Low concrete strength
- Inappropriate use of space between silos (filled with wheat), this factor caused eccentric loads between silos (horizontal loads)
- Industry unable to operate under this conditions

The Sika® Solution
- Prepare and clean surfaces and cracks
- Restore monolitism of the structure by epoxy injectioning of concrete substrate
- Externally strengthen silos with
  - SikaWrap®-230 C ca. 500m²
  - Sikadur®-330 epoxy adhesive ca. 680kg
- Application of an UV protection
- Sikagard®-550 W coating

Your local Sika Company

Our most current General Sales Conditions shall apply. Please consult the Product Data Sheet prior to any use and processing.
Why do Silos need Rehabilitation?

What are Silos?
Silos are large, thin-walled reinforced concrete shell structures with large diameter and height for storage of corn, wheat, grain, sugar, cement, coal.

Frequent Problems
- Large vertical and horizontal cracks
- Low concrete strength
- Spalling of concrete
- Construction joints
- Corrosion of re-bars
- Reduction of concrete cover for reinforcement

Reasons
- Concrete deterioration and abrasion
- Overstressing in re-bars
- Construction faults
- Inexact position of re-bars in formwork
- Design assumptions
- Pressure, dynamic and seismic loads
- User errors
- Inappropriate manipulation
- Environmental influences
(thermal variations, rain, co2, carbonation)

* Silos are specially sensible to these problems because there are thin-walled structures with wall = 20-30 cm, erected by slip- or climbingform techniques.

The Key to Success

Assessment Survey of the Condition of the Structure

Serious Damage

Immediate Full Assessment

Repair Financially, Technical Viable

Minor Damage

Cosmetic Repair + Protection

Repairable

Yes

Demolition and Rebuild

No

Is Structure safe?

Yes

Temp. Support

No

Reduction of load

Detailed Structural/ Seismic Upgrade

How?

Concrete Repair + Protection

Definition of the Future Maintenance Requirements and Procedures

Structural Strengthening + Concrete Repair + Protection

Alternative Solutions

Downgrade the Capacity of Silos
(with periodical inspection)

Rehabilitation

Demolition and Rebuilding

Concrete Repair and Protection:
- Sika System Solutions for concrete and re-bars
  - SikaQuick® System (Cosmetic Repair)
  - Sika® MonoTop® System (Structural Repair)
  - Sika® FerroGard® (Corrosion Inhibitor)
  - Sikaplan® (Membrane Systems)
  - Sikagard® (Coating Systems)

The Sika System Solutions

Structural Strengthening:
- Sika® CarboDur® CFRP plates
- Sika® CarboShear® L CFRP plates
- SikaWrap® FRP fabrics
- Prestressed Sika® CarboDur® CFRP plate systems
  - Sika® LEOBA
  - Sika - StressHead

Sika is today the worldwide Key Leader & Player in the concrete rehabilitation market field. For more information please contact the local Sika Company, which address you will find on the back side.
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