

Construction



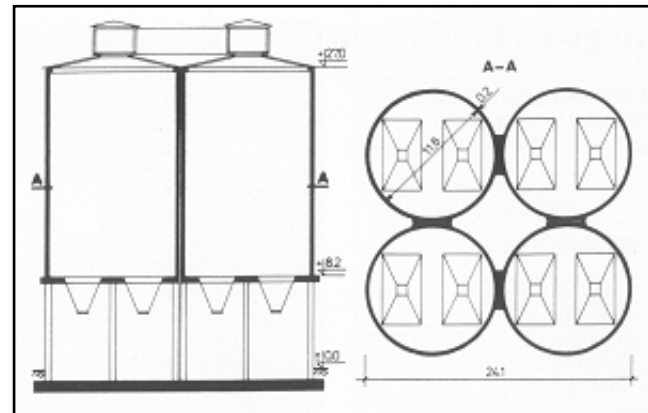
Reinforced Concrete Silos
Solutions for Maintenance,
Rehabilitation, Strengthening

Sika®

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



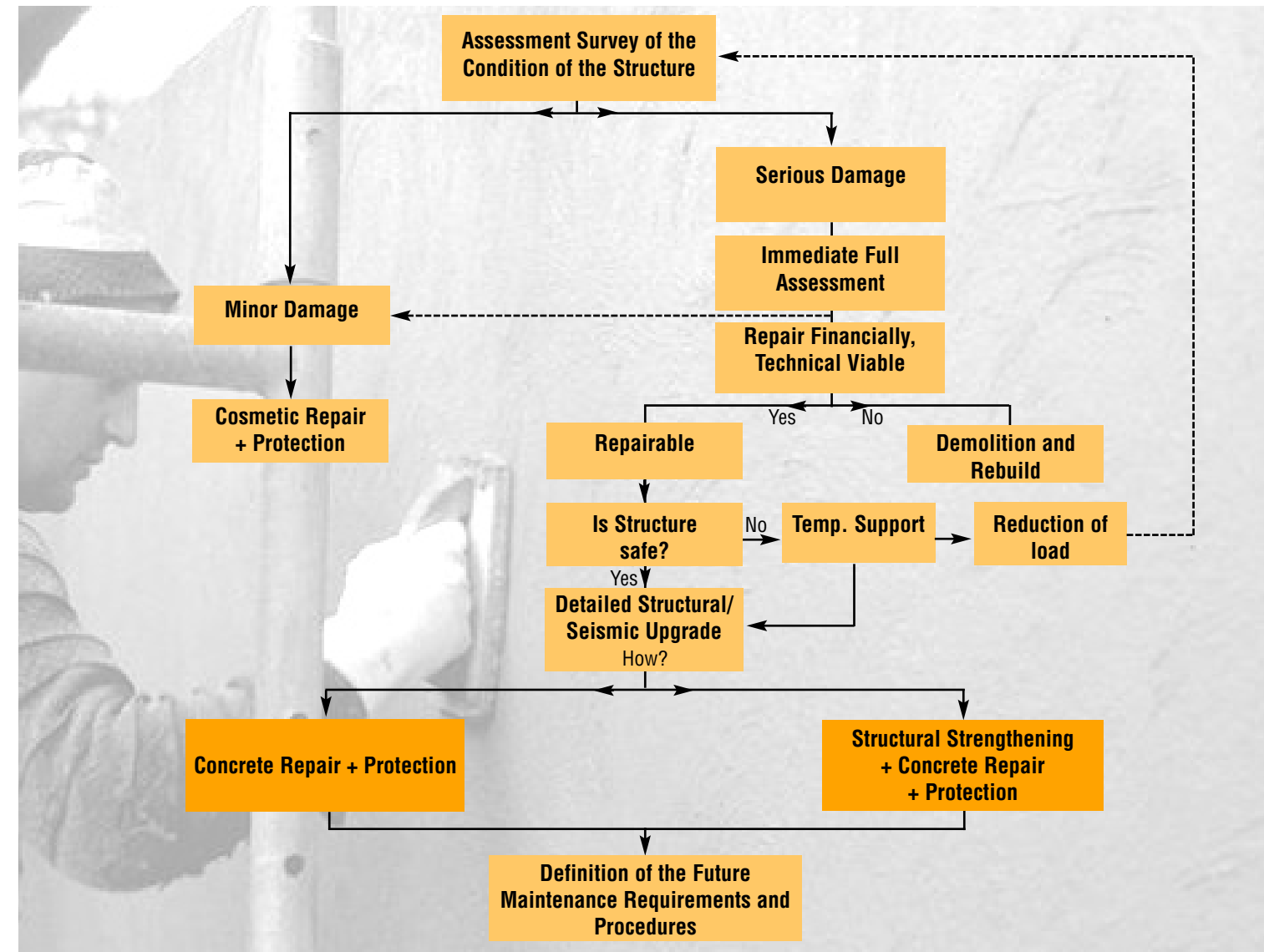
Reasons

- Concrete deterioration and abrasion (⇒ quality of concrete due to casting and/or curing)*
- Overstressing in re-bars (⇒ insufficient cover of 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)

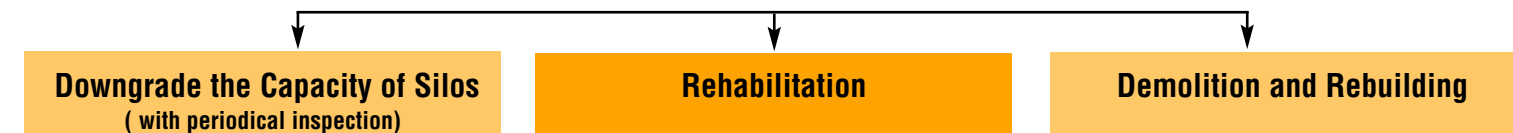
* Silos are specially sensible to these problems because there are thin-walled structures $t_{wall} = 20-30$ cm, erected by slip- or climbingform techniques.



The Key to Success



Alternative Solutions



The Sika System Solutions

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)

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.

Case Studies

Albany, Western Australia

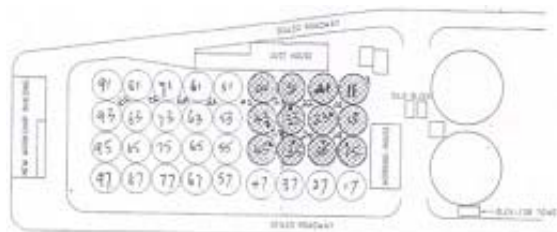



The Project

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



 Cells for strengthening

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

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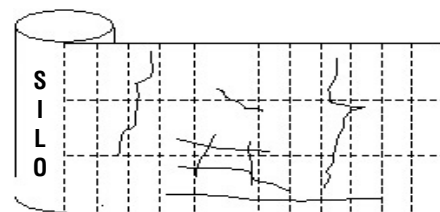


The Project

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 injection 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.

