

Construction



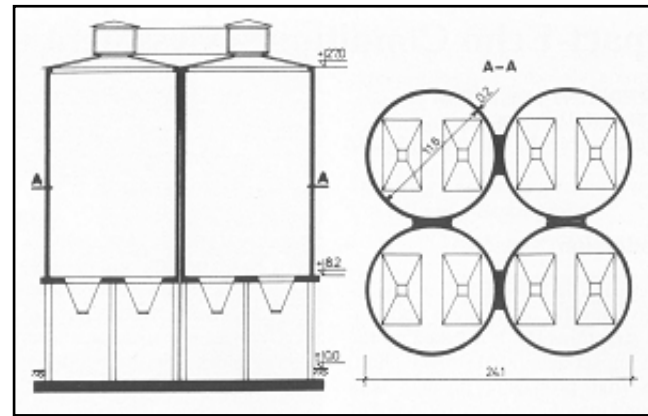
**Reinforced Concrete Silos**  
Solutions for Maintenance,  
Rehabilitation, Strengthening

**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



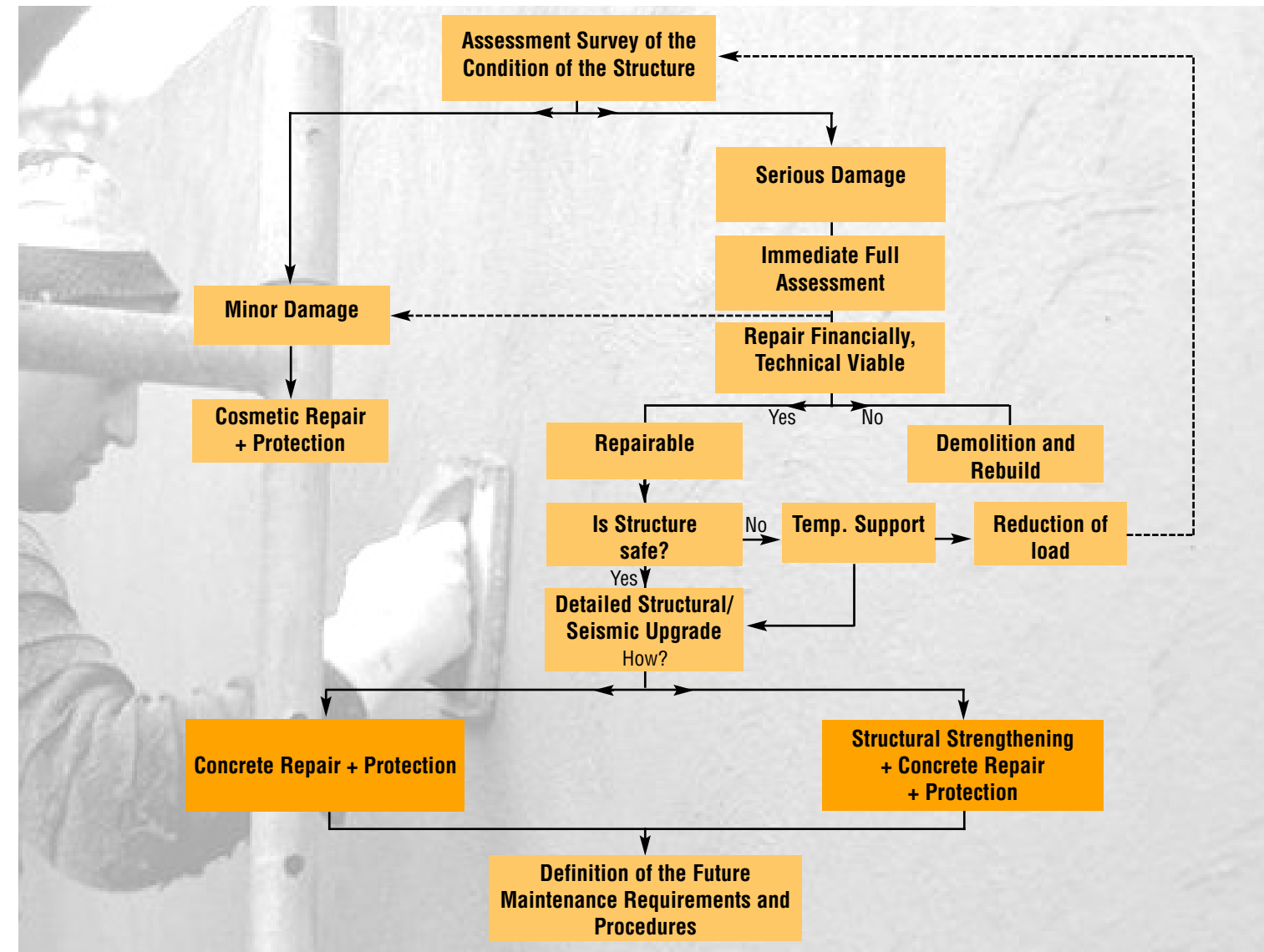
## Reasons

- 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, CO<sub>2</sub>, carbonation)

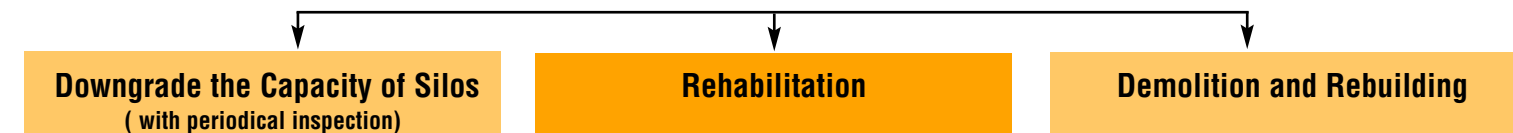
\* Silos are specially sensible to these problems because there are thin-walled structures  $t_{wall} = 20-30$  cm, erected by slip- or climbingform techniques.



# 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

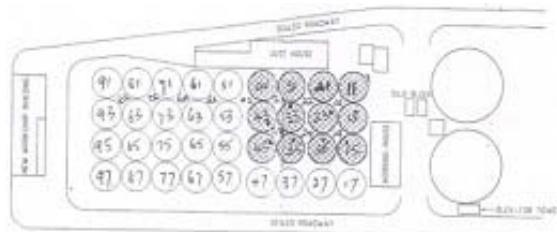



### The Project

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. 16'000m<sup>2</sup>
- ⇒ **Sikadur®-330** epoxy adhesive ca. 22'000kg

### Sika Services AG

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## Silo Santiago de Chile, Chile

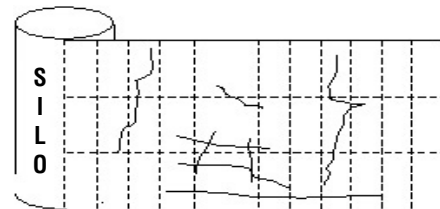


### The Project

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 injection of concrete substrate
- Externally strengthen silos with
  - ⇒ **SikaWrap®-230 C** ca. 500m<sup>2</sup>
  - ⇒ **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.

