

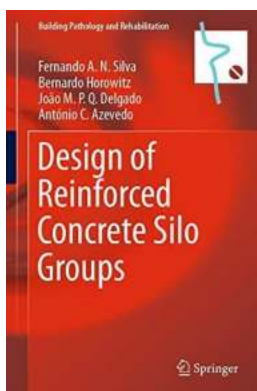
Design of Reinforced Concrete Silo Groups: Building Pathology and Rehabilitation

In the world of construction, reinforced concrete silos serve as crucial storage units for various materials. These structures provide immense strength and durability, capable of withstanding heavy loads and extreme conditions. However, over time, these silos can suffer from building pathology, requiring rehabilitation measures to ensure their long-term functionality and safety.

The Importance of Design in Reinforced Concrete Silo Groups

Designing a reinforced concrete silo group is a complex task that involves careful consideration of various factors. These include material characteristics, structural analysis, load capacity requirements, and environmental conditions. The design process must adhere to relevant codes and standards to ensure structural integrity and longevity of the silo group.

Proper design is crucial to prevent potential issues that may lead to building pathology. Inadequate design, such as insufficient reinforcement or improper load distribution, can result in structural failures, leaks, and even collapse. It is essential to engage experienced structural engineers and architects who have a deep understanding of silo design.



Design of Reinforced Concrete Silo Groups (Building Pathology and Rehabilitation Book 10)

by Mohammed Dib (1st ed. 2019 Edition, Kindle Edition)

★★★★★ 5 out of 5

Language : English

File size : 22448 KB

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Screen Reader : Supported

Enhanced typesetting : Enabled
Word Wise : Enabled
Print length : 124 pages



Building Pathology in Reinforced Concrete Silo Groups

Building pathology refers to the study of defects, damages, and deterioration in built structures. In the case of reinforced concrete silo groups, several factors can contribute to building pathology. These include corrosion of reinforcement, water ingress, chemical attacks, excessive loads, and temperature fluctuations.

Corrosion is a common problem in reinforced concrete structures exposed to harsh environments or aggressive chemicals. When reinforcement corrodes, it leads to internal expansive forces, causing cracks and spalling of concrete. Water ingress can further exacerbate this issue by facilitating the movement of corrosive agents.

Chemical attacks can occur when the stored materials release aggressive substances that react with the concrete elements. This can weaken the structure and compromise its load-bearing capacity. Excessive loads beyond the design limits can also cause structural failures, leading to cracks, deflections, or even collapse.

Rehabilitation of Reinforced Concrete Silo Groups

To address building pathology in reinforced concrete silo groups, rehabilitation measures are necessary. These measures aim to restore the structural integrity, functionality, and safety of the silo group. The rehabilitation process typically involves several steps:

1. **Structural Assessment:** A thorough inspection is conducted to assess the extent of damage and identify the underlying causes. Non-destructive testing techniques such as ultrasound, thermography, and ground-penetrating radar can be used to evaluate the condition of the concrete and reinforcement.
2. **Repair and Strengthening:** Depending on the findings of the structural assessment, various repair and strengthening techniques can be employed. These may include concrete patching, corrosion treatment, reinforcement replacement, or additional reinforcement installation. The choice of rehabilitation method depends on the specific pathology and the desired structural performance.
3. **Waterproofing:** To prevent further water ingress and corrosion, effective waterproofing systems should be implemented. This can involve the application of waterproof coatings or the installation of water barriers such as membranes or sealants.
4. **Maintenance and Monitoring:** Regular maintenance and monitoring are essential to detect any potential issues early on. This includes inspections, cleaning, and upkeep of the silo group to ensure its long-term performance.

Designing and rehabilitating reinforced concrete silo groups require meticulous attention to detail and expertise. The proper design of silo structures significantly reduces the risk of building pathology, ensuring their functionality and safety. In cases of deterioration or defects, rehabilitation measures should be carried out promptly to restore the structural integrity and prolong the lifespan of the silo group. Regular maintenance and monitoring are vital to prevent future issues and guarantee the optimal performance of these essential storage units.

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This book offers a new calculation procedure of the structural behavior of grouped layout of silos, easy to use and with satisfactory responses.

Groups of reinforced concrete silos are structures commonly used in the food industry, where it is usually necessary to separate the storage of different types and sources of grain.

The grouped layout of silos has numerous benefits when compared with single-cell silos in which the emphasis is on creating further space for silage, normally referred to as interstice – a space formed between the edges of the group's cells. This economic benefit, on the other hand, raises a structural problem for the designer of this type of building, which is to assess the magnitude of bending moments and hoop forces due to the structural continuity of the walls in the interstice region of the cells. Bending moments assume extreme values exactly when the interstice is loaded and the other cells in the group are empty.

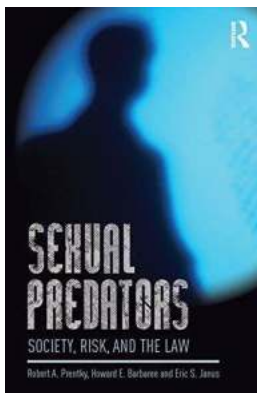
To develop the formulation of the proposed analysis models, a parametric study was carried out that allowed the adequate consideration of the variables involved.

The idea is to help professionals, engineers, industrials and academics involved in this advanced interdisciplinary field as a comprehensive guide for courses offered at different levels of learning (undergraduate and postgraduate).



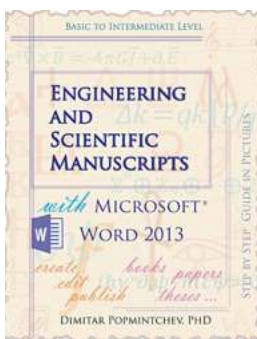
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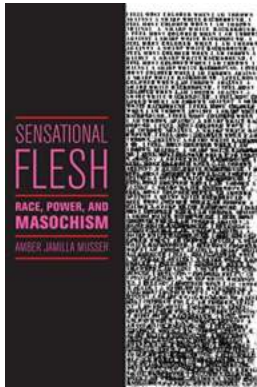
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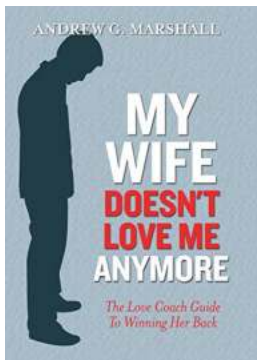
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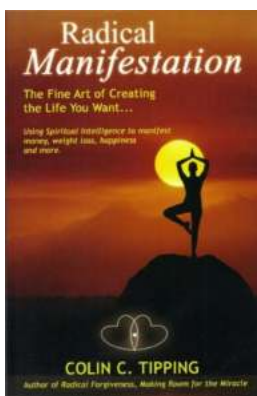
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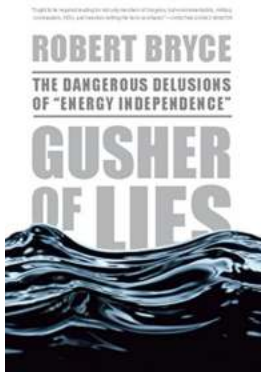
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