Available online at www.sciencedirect.com

ScienceDirect

Procedia Engineering 172 (2017) 685 – 691

Procedia Engineering

www.elsevier.com/locate/procedia

Modern Building Materials, Structures and Techniques, MBMST 2016

Some causes of reinforced concrete silos failure

Marek Maj*

Faculty of Civil Engineering, Wrocław University of Technology, 50-370 Wrocław Pl. Grunwaldzki 11, Poland

Abstract

This paper presents some problems connected with causes of reinforced concrete silos failure. Reinforced concrete silos and other shells were built for decades. Vitality i.e. durability of cracked silo walls are one of the most important parameters during designing process, constructional and exploitation time of these shells. Some reasons of appearance of horizontal and vertical cracks as temperature, pressure of stored material, live loads e.g. wind, dynamic character of wind, moisture, influence of construction joints, thermal insulation, chemistry active environmental etc. reduce the carrying capacity of the walls of the silos and causes lower the state of reliability. Horizontal and vertical cracks can cause corrosion of concrete and steel bars, decreasing stiffness of contraction, bigger deflection, increasing of carbonation of concrete cover and dank of concrete wall. Horizontal and vertical cracks allow condensate water infiltrates into wall. Local and global imperfactions of concrete shells are increasing according to greater number of cracks. Taking into account these facts, reducing of strength parameters reduce the service life of the whole reinforced concrete structure causing failure status. The technology of repairing cracked walls must take into consideration the model of failure, simple one parameter or complex as series or parallel system models.

Peer-review under responsibility of the organizing committee of MBMST 2016

Keywords: durability, silo, concrete, reliability.

1. Introduction

In recent years many engineers objects, as reinforced concrete silos, tanks are renovated. In particular they are not only renovated but also strengthened. Most of them lost their designed durability life, another failed with frequency which is much higher than almost any other industrial equipment. The basic reason of this state is

*. Tel.: +48 71 320 25 10;.
E-mail address: marek.maj@pwr.edu.pl

Peer-review under responsibility of the organizing committee of MBMST 2016
doi:10.1016/j.proeng.2017.02.081