

# Experimental And Theoric Approach To Slanted Concrete Cylinders Subjected To Uniaxial Pressure

Selçuk Emre GÖRKEM<sup>1</sup>

Bozok University, Department of Civil Engineering, 66100 Yozgat, Turkey

## ABSTRACT

In this study, one of the parameters which influences concrete compressive strength was investigated by using 50 standard high strength concrete cylinder specimens. This effect is inclination at one-end. When concrete filled molds are put on a sloping place, fresh-mixed concrete starts flow and inclination emerges after hardening. It is observed that failure loads are related with inclination. Angled cracks occurred in inclined specimens. Experimental behavior was presented by an exponential curve.

**Keywords:** slanted cylinders; standard cylinder specimen; compression strength; concrete

## 1. INTRODUCTION

Standard cylinder specimens,  $d=150\text{mm}$  and  $h=300\text{mm}$ , are used world-wide to determine concrete compressive strength by means of uniaxial compression tests. Concrete must be allowed to harden about twenty-four hours in molds and cured for 28 days. At the 28<sup>th</sup> day, specimens are tested in order to determine compression strength. It is the most widely-used mechanical property in projects when concrete is the load-bearing material. There are some factors affecting concrete's compressive strength, such as the type of cement, water-to-cement ratio, rate of loading, addition of cementitious materials, aggregate, moisture, temperature conditions during cure, age of concrete, and capping. If cylinder specimens taken from the same concrete mix were exposed to different curing conditions, their strength values would become different [1, 2]. Under variable-rated loading, sometimes more than one peak points occur at stress-strain diagrams. High speed loading causes larger compression strength measurements [3]. Capping is another effect on compressive strength [4]. In order to minimize the variations, specimens must be carefully-treated to testing, such as the same curing conditions and the same loading rate. But there can be still variations between the strength values of the same-treated specimens. Distribution of aggregates in concrete mix, cavities in matrix or disorder in geometry should be considered besides many influencing factors. In this regard, a type of geometric-disorder is investigated in this study. Mentioned disorder is inclination at one-end of the cylinder.

In practice, properly lubricated cylinder molds are filled in 3 levels with compaction. Fully stuffed molds are put in a suitable place to harden and unraveled after twenty-four hours [5,6]. Studied problem emerges at this waiting period. When molds are put on a sloping surface, wet concrete starts flow to be parallel where they are placed. Emerge of inclination can be seen in Fig. 1.

---

<sup>1</sup> Tel. : +905052569787; fax: +903542421005

E-mail addresses: [selcukgorkem@yahoo.com](mailto:selcukgorkem@yahoo.com) , [sgorkem@ktu.edu.tr](mailto:sgorkem@ktu.edu.tr)