Pervious Concrete

Reported by ACI Committee 522

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*The members of ACI Committee 522 dedicate this document to the memory of Dan Brown.
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This report provides technical information on pervious concrete's application, design methods, materials, properties, mixture proportioning, construction methods, testing, and inspection.

The term "pervious concrete" typically describes a zero-slump, open-graded material consisting of portland cement, coarse aggregate, little or no fine aggregate, admixtures, and water. The combination of these ingredients will produce a hardened material with connected pores, ranging in size from 0.08 to 0.32 in. (2 to 8 mm), that allow water to pass through easily. The void content can range from 18 to 35%, with typical compressive strengths of 400 to 4000 psi (2.8 to 28 MPa). The drainage rate of pervious concrete pavement will vary with aggregate size and density of the mixture, but will generally fall into the range of 2 to 18 gal./min/ft^2 (81 to 730 L/min/m^2).

Keywords: construction; design; drainage; permeability; pervious concrete pavement; stormwater; testing.

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ACI 522R-06 became effective April 3, 2006.

CHAPTER 1—INTRODUCTION

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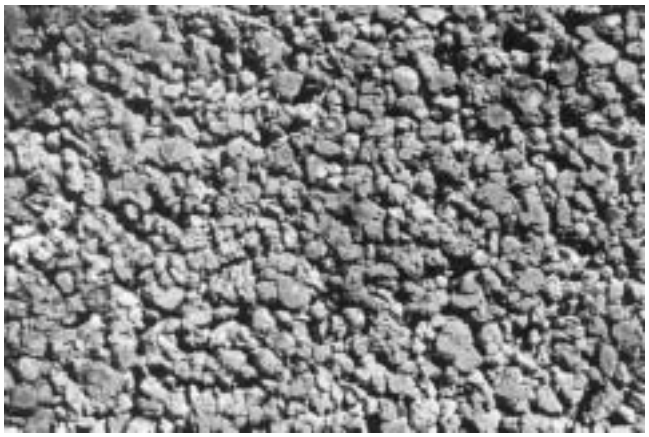

Fig. 1.1—Pervious concrete pavement texture on parking lot.

The term "pervious concrete" typically describes a zero-slump, open-graded material consisting of portland cement, coarse aggregate, little or no fine aggregate, admixtures, and water. The combination of these ingredients will produce a hardened material with connected pores (Fig. 1.1), ranging in size from 0.08 to 0.32 in. (2 to 8 mm), that allow water to pass through easily. The void content can range from 18 to 35%, with typical compressive strengths of 400 to 4000 psi (2.8 to 28 MPa). The drainage rate of pervious concrete pavement will vary with aggregate size and density of the mixture, but will generally fall into the range of 2 to 18 gal./min/ft^2 (81 to 730 L/min/m^2).

Concern has been growing in recent years toward reducing the pollutants in water supplies and the environment. In the 1960s, engineers realized that runoff from developed real estate had the potential to pollute surface and groundwater supplies. Further, as land is developed, runoff leaves the site in higher rates and volumes, leading to downstream flooding and bank erosion. Pervious concrete pavement reduces the impact of development by reducing runoff rates and protecting water supplies.

CHAPTER 2—APPLICATIONS

2.1—General

Pervious concrete has been used in a wide range of applications, including:

- Pervious pavement for parking lots (Fig. 1.1);
- Rigid drainage layers under exterior mall areas;
- Greenhouse floors to keep the floor free of standing water;
- Structural wall applications where lightweight or better thermal insulation characteristics, or both, are required;
- Pavements, walls, and floors where better acoustic absorption characteristics are desired;
- Base course for city streets, county roads, driveways, and airports;
- Surface course for parking lots, tennis courts, zoo areas, and animal barns and stalls;
- Bridge embankments;
- Swimming pool decks;
- Beach structures and seawalls;
- Sewage treatment plant sludge beds;