# SHEAR AND FLEXURAL BEHAVIOR OF R.C. BEAMS STRENGTHENED WITH POLYUREA SPRAY

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## ABSTRACT

Recent research was conducted to study the flexural and shear behavior of R.C beams strengthened externally by sprayed polyurea system. In addition, the effectiveness of changing the thickness of polyuria was studied. The technique of polyurea system to strengthen R.C beams was investigated in order to evaluate the increase in the flexure and shear capacity of beams. Small and large scale of beams was examined. Different strengthening schemes for beams were used with variable thickness of polyurea. Sixteen specimens were prepared and divided into six flexure beams and ten shear beams. The experimental results included ultimate load, vertical deflection along the beams, overall ductility, and containing fragmentation. The polyurea system showed measurable increase in flexure and shear capacity of beams. Moreover, the ductility of beams was increased. The ability of containing fragmentation was clearly achieved by polyurea coating.

### Keywords: Beams Retrofitting, Ductility, Flexure Strength, Polyurea, Shear Strength

#### Abbreviations

LVDT-R: linear variable deformation transducer in the right side of specimen; LVDT-L: linear variable deformation transducer in the left side of specimen; LVDT-C: linear variable deformation transducer in the center of specimen; LVDT-CL: linear variable deformation transducer in the center span of specimen under left load point; LVDT-CR: linear variable deformation transducer in the center span of specimen under right load point; VL:: vertical position; HL:: horizontal position; F: Flexure Test, SR: Shear Test, with Stirrups, SN: Shear Test, without Stirrups, S-C: Small Scale Control Beam, S-P: Small Scale Beam with Polyurea, L-C: Large Scale Control Beam, L-P: Large Scale beam with Polyurea

### I. INTRODUCTION

Reinforced concrete structures around the world are frequently subjected to greater challenges such as change of use, increase in the existing loads, and durability of aging structures. For that, rehabitation, upgrading of structural members and maintenance, are more suitable way for increasing the serviceability of structural members. To coup with the great structural demands, many attempts of repairing and retrofitting methods have been developed to increase strength of RC beams. Steel plates or Fiber-Reinforced Polymers (FRP) is one of the external strengthening systems that can be used for RC beams. This research investigates a new external strengthening system that called "polyurea system" that would have a spray application rather than the