Confinement Model for Bridge Columns Using Cross Spirals

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Objectives
- Modification of model parameters
- Prediction model for normal strength concrete
- Prediction model for high-strength concrete
- Theoretical stress-strain relationship for normal and high-strength concrete

Model Development

Model Parameters

Normal Strength Data
High Strength Data

Proposed Model

Core Area
Confined Compressive Strength
Confined Pressure
Effective Core Area
Confinement Effectiveness Ratio
Two Data Sets

Normal Strength

High Strength

Normal Strength Data Series

- Single Spiral
  - Normal Concrete
  - Double Spiral
  - 39.2 MPa
  - 36.1 MPa

High Strength Data Series

- High Strength
  - Single Spiral
  - Double Spiral
  - 67.3 MPa
Stress-Strain Relationships

Mander et al. (1988)

Bing et al. (2001)

Normal Strength 25X6-1

Normal Strength 35X6-1

Normal Strength 70X6-2

High Strength 50X8

High Strength 100X8
Conclusions

- Mander et al. model modification
- Normal strength concrete follows Mander et al. prediction model
- High-strength concrete does not follow the Mander et al. or Bing et al.
- Stress-Strain relationship for normal strength is best described by Mander et al.
- Stress-Strain relationship for high-strength is best described by Bing et al.