# RILEM TG2 - Mixture & Compaction

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# Welcome!

- ➢ Brief overview of project
- ➢ Material shipment
  - ➢ Loose mix and field slabs
- ➢ Laboratory compaction status
- ➢ State of the Art report
- ➢ Presentations:
  - ➢ Dr. Emin Kutay
  - ➢ Dr. Amit Bhasin
  - ➢ Dr. Zhanping You
  - ➢ Carl Johnson
  - ➢ Dr. Hussain Bahia
- ➢ Closing items

# Background

- ➤ The objective of the research is to develop tools other than density to identify mixture micro-structure.
- ➤ LCPC test track material available for laboratory compaction - 6 different methods
- ➤ Specimens will be evaluated using:
  - ➤ Gamma-ray densometer (field slabs)
  - ➤ X-ray computed tomography
  - ➤ 2-D scanned image analysis
  - ➤ Mechanical testing (E*, FN)

# Material Shipment

| LAB No. | LAB name | Task #1 COMPACTION METHODS | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | 1 | 2 | 3 | 4 | 5 | 7 | | |
| | | Gyratory Š US | Gyratory - CE | French Roller | German sector | Marshall | Hveem | Total amount (kg) | Number of buckets |
| 10 | AIT | | | | | 20 kg | | 20Ź? | 1 |
| 14 | UC Š Davis | | | 30 kg | | 70 kg | | 100Ź? | 3 |
| 2 | EMPA | 20 kg | | 30 kg | | 20 kg | | 70 ? | 2 |
| 7 | LCPC | | 20 kg | 30 kg | | | | 50 ? | 2 |
| 9 | Liverpool | | | | 40 kg | | | 40 ? | 2   1 |
| 3 | Michigan Tech | 20 kg | | | | | | 20 ? | 1 |
| 10 | Technical Univ. of Braunschweig | | 20 kg | | 40 kg | 20 kg | | 80 ? | 3 |
| 5 | Total | | 20 kg | 30 kg | | | | 50 ? | 2 |
| 8 | UFC Š Petrobas | 20 kg | | 30 kg | | 20 kg | | 70 ? | 3 |
| 11 | University of Parma | | | | 40 kg | | | 40 ? | 2 |
| 1 | UW Š Madison | 20 kg | | | | | | 20 ? | 1 |
| 16 | Nottingham | | 20 kg | | | | | 20 ? | 1 |
| 21 | University of Palermo | | | | 40 kg | | | 40 ? | 2 |
| | | | | | | | Total | 620 | 25 (perfect) |

# Lab Compaction Status

- So far, compaction data received from:
  - UW-Madison
  - EMPA
  - LCPC
  - Michigan Tech
- Most labs have material and are currently producing specimens
- Need to finalize distribution of specimens for imaging and analysis
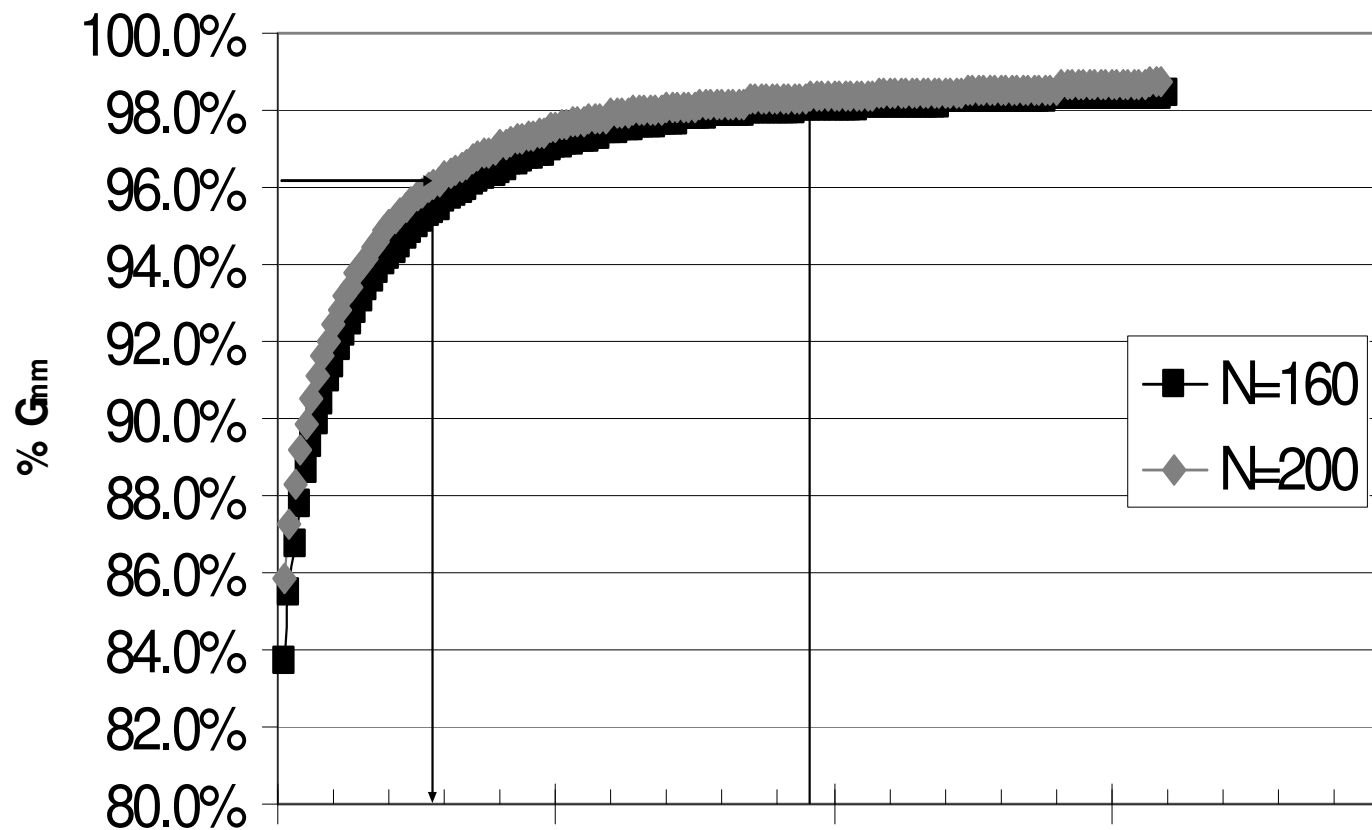
# Superpave Gyratory Data

➤ Temperature: 135°C

➤ Pressure: 600 kPa

➤ Target density: 4% air voids
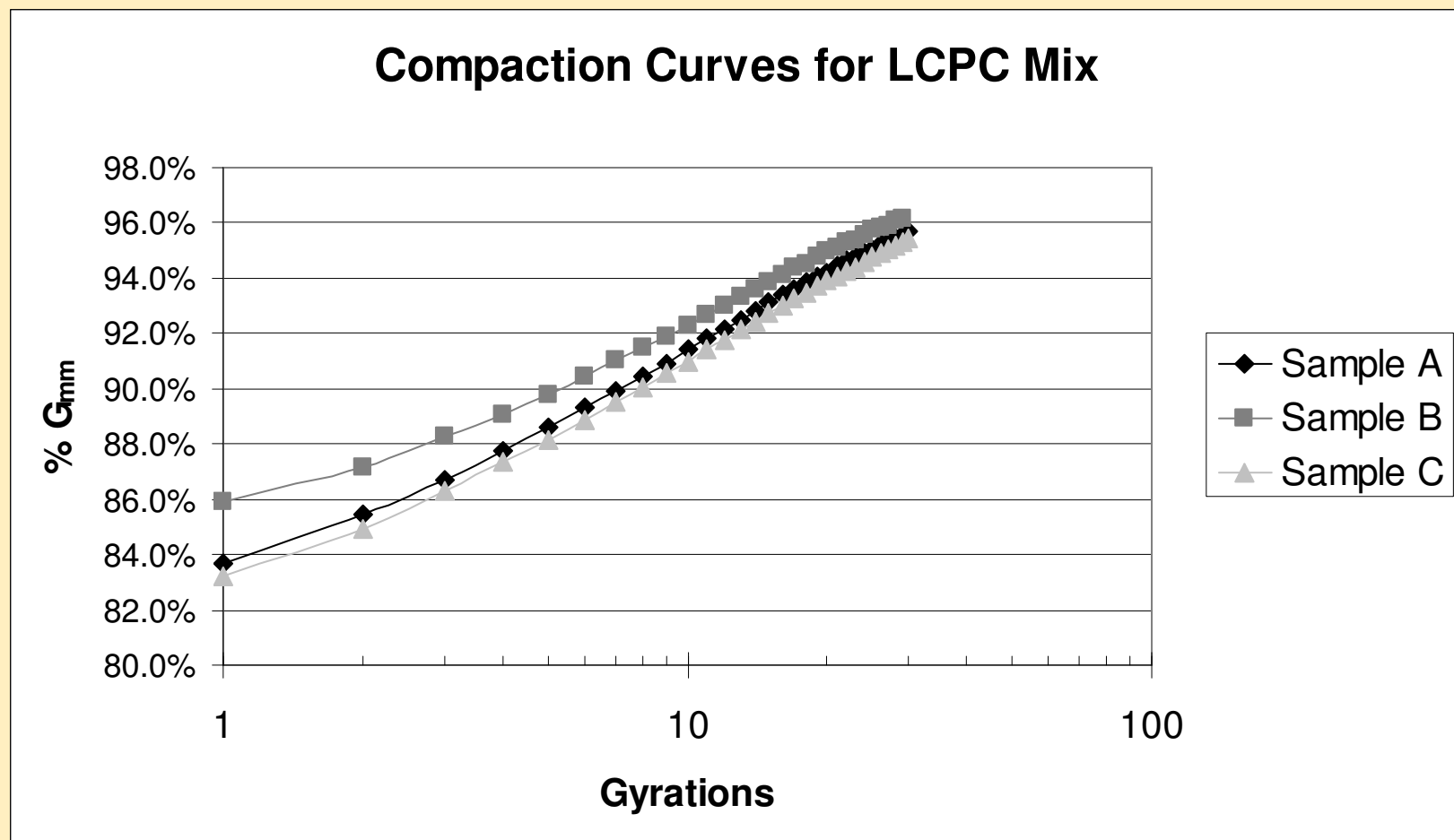
# Superpave Gyratory Data

Diagnostic Compaction Curves

# Superpave Gyratory Data

➤ Compacted 3 samples to 30 gyrations

**Compaction Curves for LCPC Mix**

# On to analysis…

➤ Now that we are generating specimens, we need to decide on a "best practice" for image analysis.

➤ Mechanical testing procedures are well-defined.

➤ Image analysis procedures can vary by researcher.