

Introduction

One of the key factors of a fundamental characterisation of asphalt mixes is the specimen development. The material response of asphalt mixtures is state of stress dependent. Therefore to assess a one-o-one relation between a state of stress and the corresponding response, test specimen must be uniform. The use of gyratory compactor for producing cylindrical asphalt mixture specimens, even in presence of reclaimed asphalt (RA), is a well-accepted procedure over other methods. However, previous studies on the gyratory compacted specimens have reported that higher air voids were observed at the top and bottom than the middle section of the specimen indicating the non-homogeneity in the laboratory compaction.

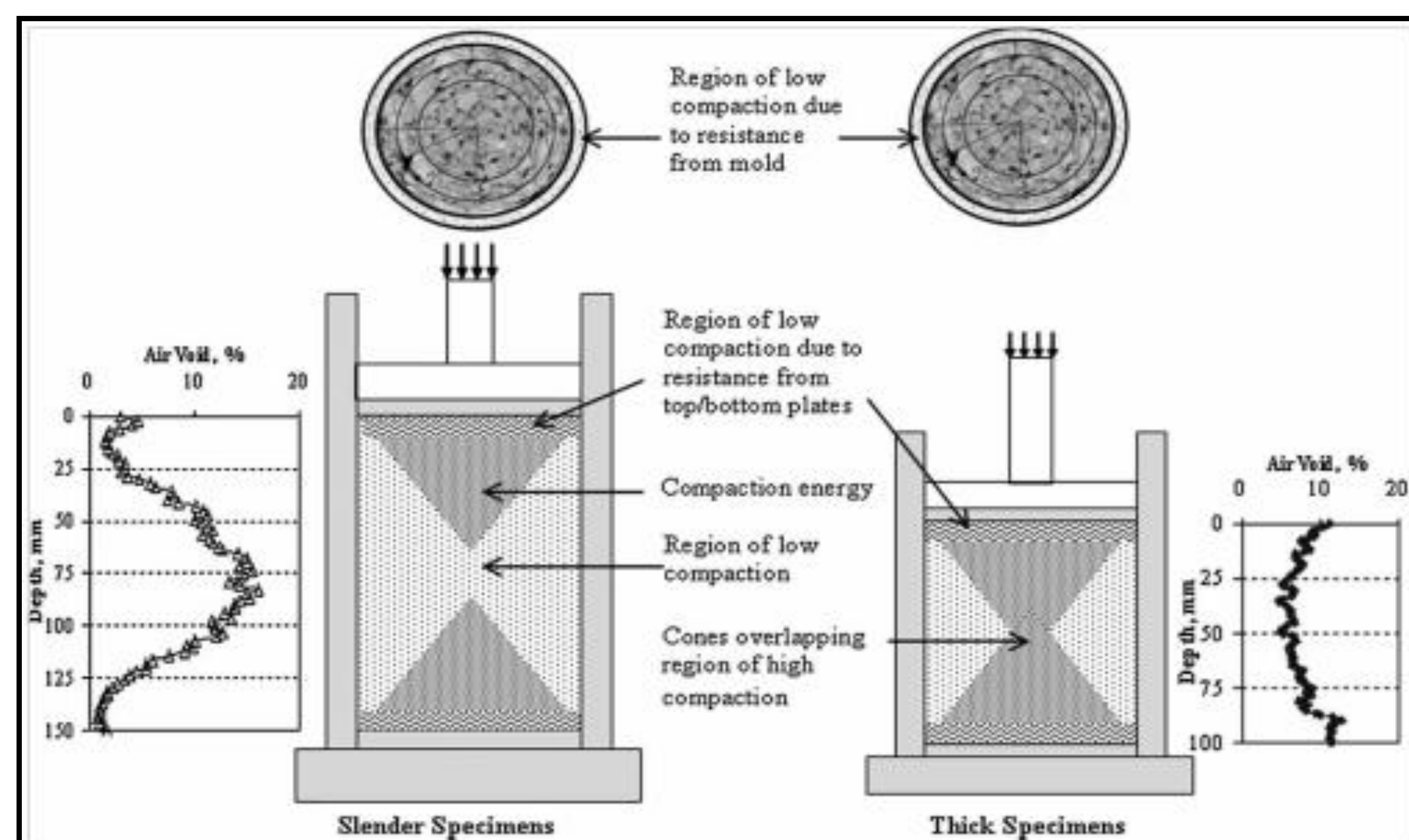
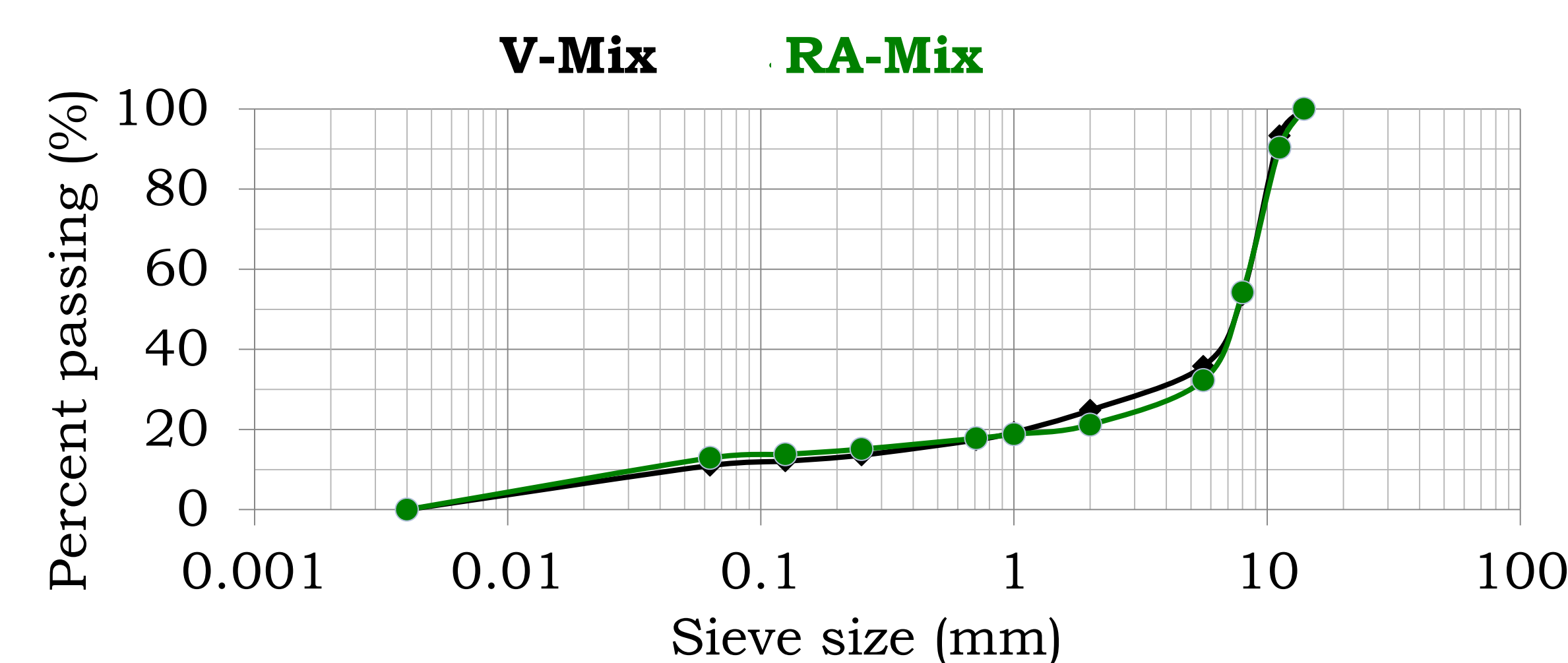


Figure 1 Compaction energy distributions according to Thyagarajan et al., (2009)

Objectives

The overall aim of this study is to provide a protocol which uses common laboratory procedures to confidently using gyratory compaction for the production of reclaimed asphalt test specimens.

Materials

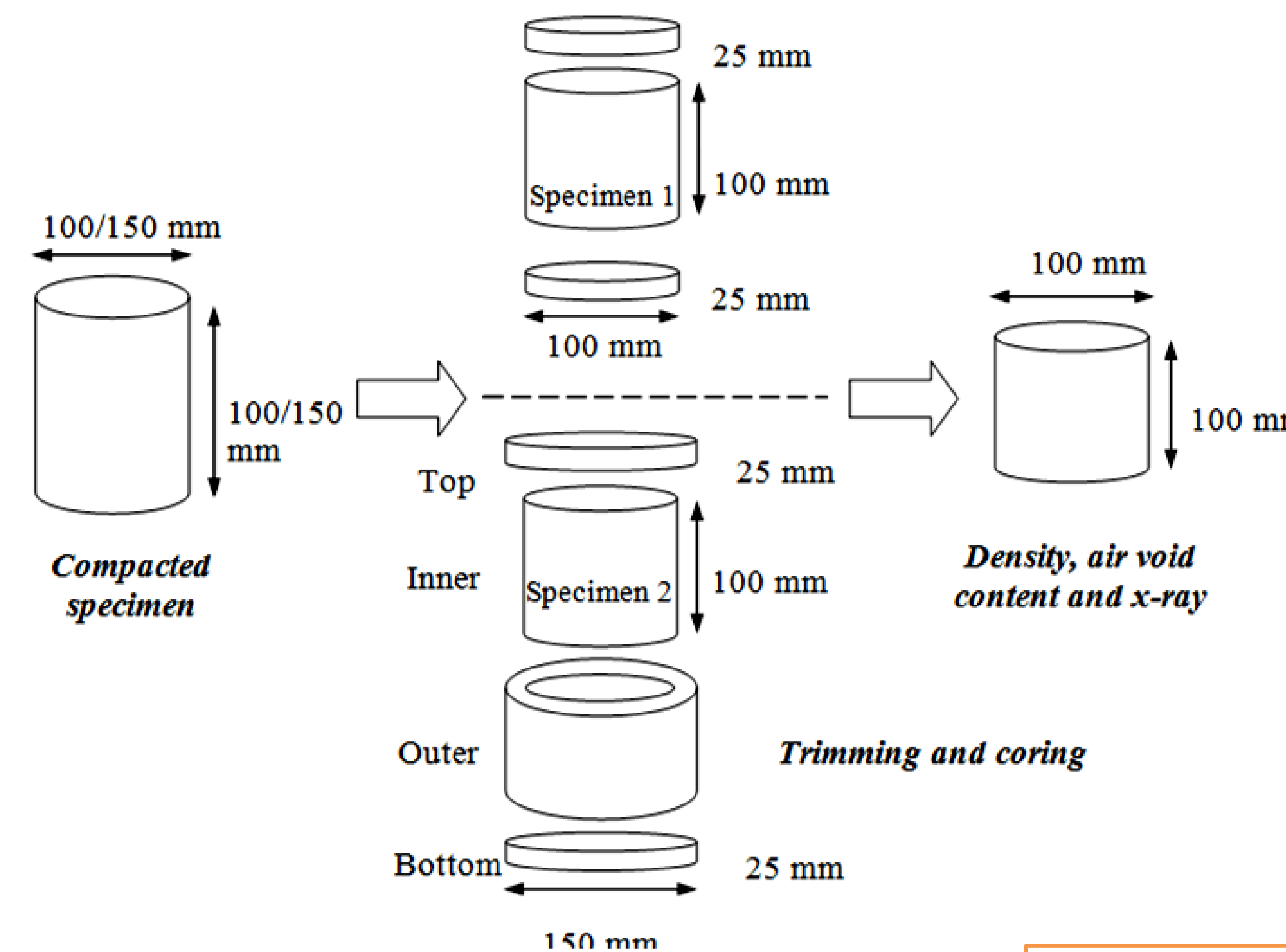


	Mix type	Maximum density	Binder content	Binder Pen (EN 1426)	Binder SP (EN 1427)	Viscosity @150 °C (EN 13302)
V-Mix	SMA 11 S (0%RA)	2454 g/cm ³	6.5%	30 dmm	64.2 °C	0.63 Pa.s
RA-Mix	SMA 11 S (30%RA)	2485 g/cm ³	7.2%	21 dmm	70.8 °C	1.06 Pa.s

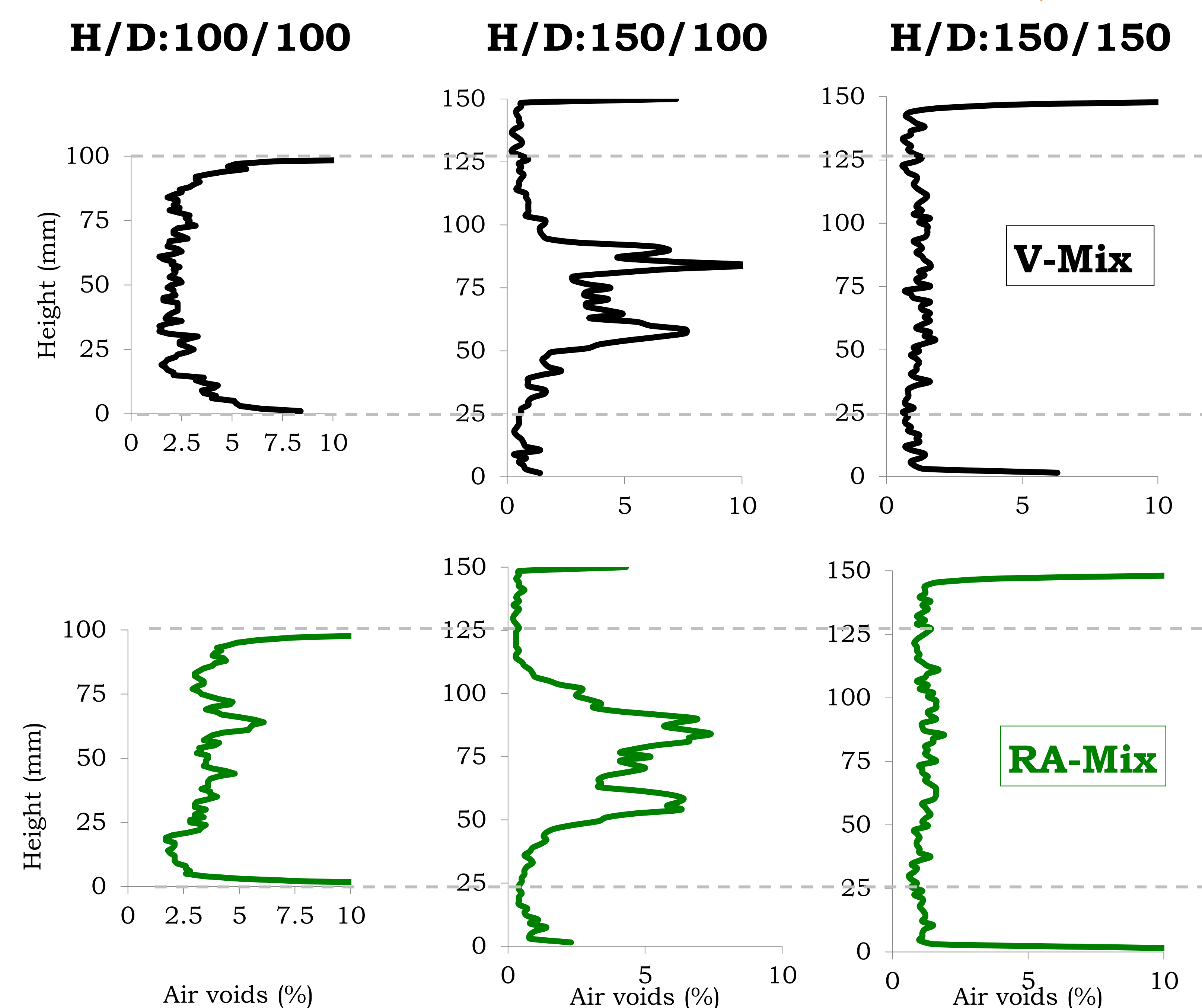
Experimental procedures and Results

I. Establishing a procedure to obtain 100 x 100 RA specimens with homogenous distribution of air voids.

- ☐ Gyratory compaction
- ☐ X-Ray CT
- ☐ Core & Rings analysis
- ☐ Buoyancy tests
- ☐ Trimming and coring procedures



RESULTS:



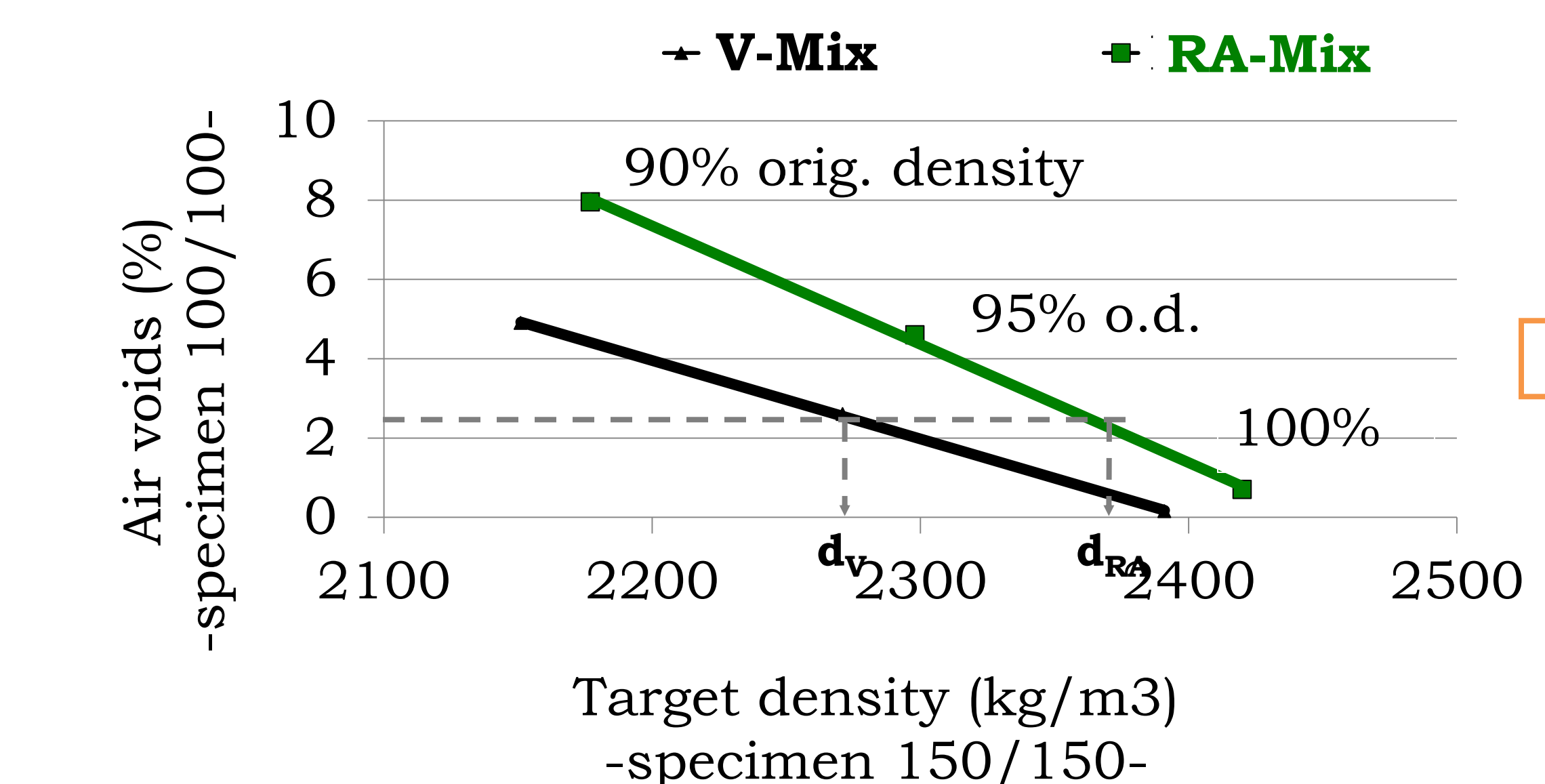
Conclusions I

- ☐ X-ray CT scanning and the proposed Cores & Rings analysis proved to be very useful tools to non-destructively assess the homogeneity of gyratory compacted RA specimens.
- ☐ homogeneous RA test specimen can be obtained by producing 150mm x 150mm gyratory specimens followed by trimming and coring works.
- ☐ Compacting slender gyratory specimen with a H/D ratio of 1.5 involves a different compaction mechanism than using a H/D ratio of 1.0. This procedure is not convenient for producing homogenous test specimen.

Conclusions II

- ☐ Homogenous cylindrical test RA specimens with fixed air void content (density) can be manufactured by coring and cutting gyratory specimens of 150/150 mm manufactured by targeting to about 96% of the initial target density.

II. Achieving homogeneous 100 x 100 RA specimen with a fixed air void content (target density)



95-97% of the original target density

