

CHAPTER III

SAMPLE PREPARATION

3.1 Introduction

This chapter provides a detailed description of the rock samples used in this study. Tests are conducted on three rock types to investigate the effects of different testing parameters.

3.2 Rock sample preparation

This study examines three rock types: Khao Khad limestone, Phu Phan sandstone, and Buriram basalt. The mineral compositions of these rocks, determined through XRD analysis, are detailed in Table 3.1, which are widely exposed in northeastern Thailand. The rock specimens are cut and ground to create saw-cut surfaces following the ASTM D7625-22 standard practice. Rectangular block specimens with nominal dimensions of 80 × 50 × 40 mm³ are prepared, featuring artificial fractures (saw-cuts) perpendicular to the test surfaces (Figure 3.1).

Table 3.1 details mineral compositions of three rock type obtained from XRD analysis.

Rock Type	Code	Mineral Compositions
Phu Phan sandstone	Kpp	77.10% Quartz, 8.35% Chlonite, 5.08% Glauconite, 4.72% Kaolinite, 1.80% Illite, 1.29% Feldspar, 1.12% Mica, 0.40% Montmorillonite, 0.09% Magnetite, 0.04% Calcite
Buriram basalt	Qbs	34.81% Anorthite, 19.97 % Albite, 16.19% Orthoclase, 12.25% Chlorite, 7.35 % Muscovite, 4.97% Calcite, 3.07% Kaolinite, 1.37% Hematite, 0.03% Quartz
Khao Khad limestone	Pkd	93.54% Calcite, 2.77% Dolomite, 0.95% Montmorillonite, 0.85% Quartz, 0.71% Feldspar, 0.64% Chalcopryrite, 0.48% Fluorite, 0.05% Kaolinite

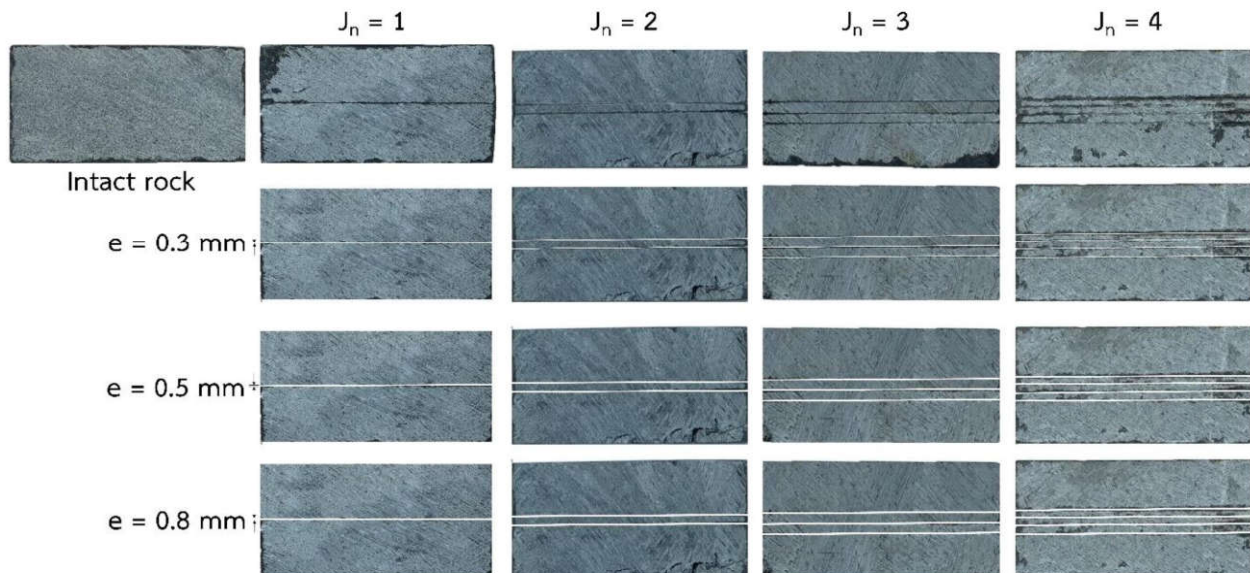


Figure 3.1 Some specimens used in CERCHAR testing for Khao Khad limestone.

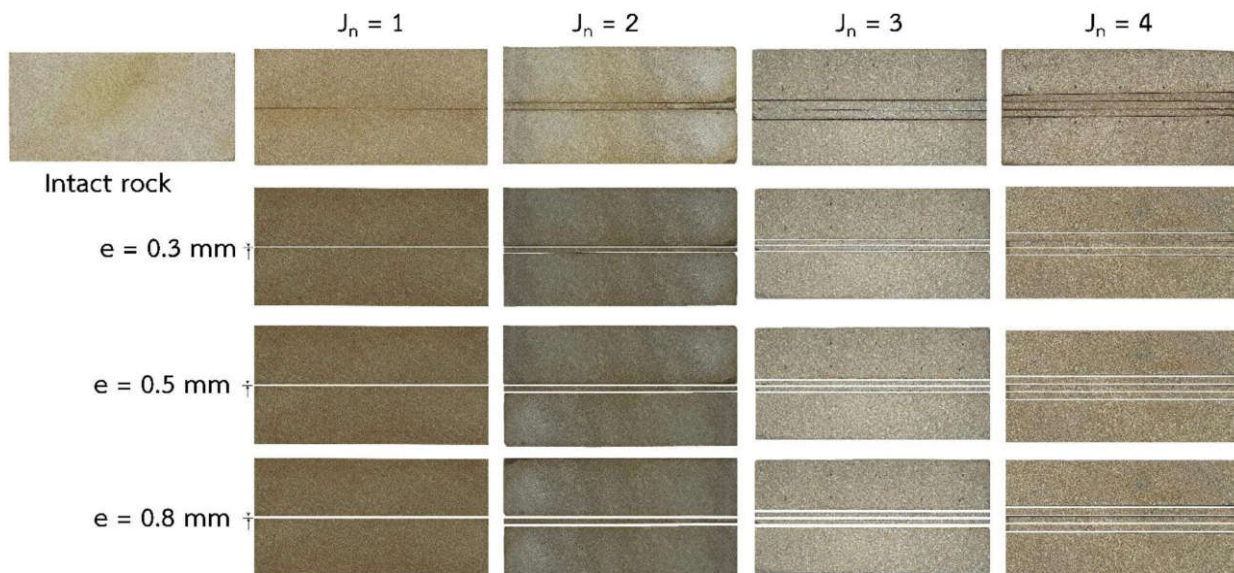


Figure 3.2 Some specimens used in CERCHAR testing for Phu-Phan sandstone.

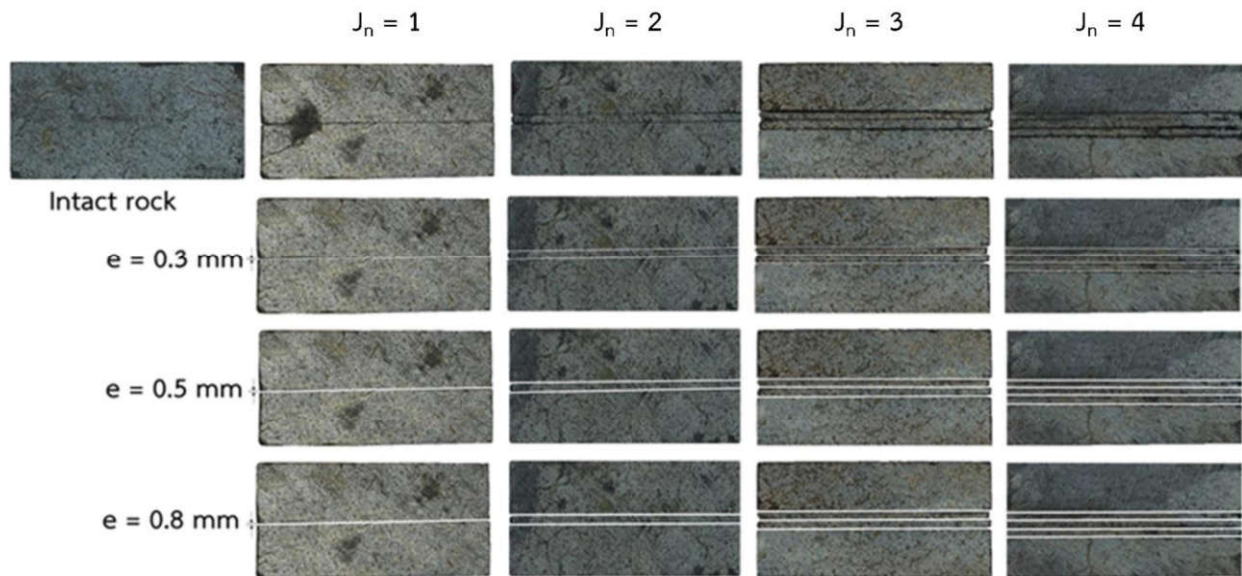


Figure 3.3 Some specimens used in CERCHAR testing for Buriram basalt.

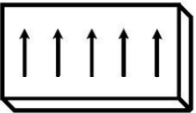
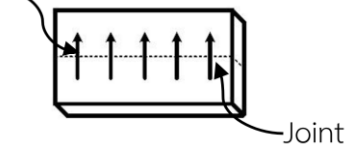
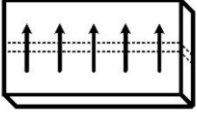
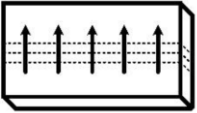
The number of parallel joints ranges from 1 to 4, with joint apertures varying between 0 and 0.8 mm (Table 3.2). The joint apertures are created using filler gauges placed between thin rock slabs to achieve precise gaps (apertures). These slabs are then bonded together while maintaining the desired joint apertures and spacing.

The specimens are prepared with three different characteristics for joint and different apertures. Each case is shown in Table 3.2 and is described below.

Case I: specimens are prepared to study intact rock on saw-cut surface,

Case II: One joint specimen are prepared to study the effect of parallel joints are varied joint apertures from 0 to 0.8 mm, **Case III:** Two parallel joints specimens with two joint frequencies are used in this case and varied joint apertures from 0 to 0.8 mm, **Case VI:** Three joints parallel joints with three joint frequencies are used in this case and varied joint apertures from 0 to 0.8 mm, **Case V:** Four parallel joints with four joint frequencies are used in this case and varied joint apertures from 0 to 0.8 mm. The multiple joint specimens use joint spacing of 2 mm

Table 3.2 Specimens prepared for numbers of parallel joints varied from 1 to 4, with joint apertures from 0 to 0.8 mm.

Cases	Joint number	e (mm)	Specimens
I	J_0	-	
II	J_1	0 0.3 0.5 0.8	Scratching 
III	J_2	0 0.3 0.5 0.8	
IV	J_3	0 0.3 0.5 0.8	
V	J_4	0 0.3 0.5 0.8	