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# Monotonic mechanical behaviour of compacted completely decomposed granite with various inclusion levels of incineration bottom ash

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**Keywords:**
Completely decomposed granite; Incinerator bottom ash; Compaction degree; Characteristic volumetric content; Soil reinforcement

# IBA reinforced the CDG

**(CDG)**
**Completely decomposed granite**

**Widely distributed in south China; need to be reinforced when used**

**Seek reinforcement**

**(IBA)**
**Incineration bottom ash**

**High strength; environment-friendly**

Different compaction degrees of CDG

**Monotonic triaxial tests**

Different volumetric contents of IBA

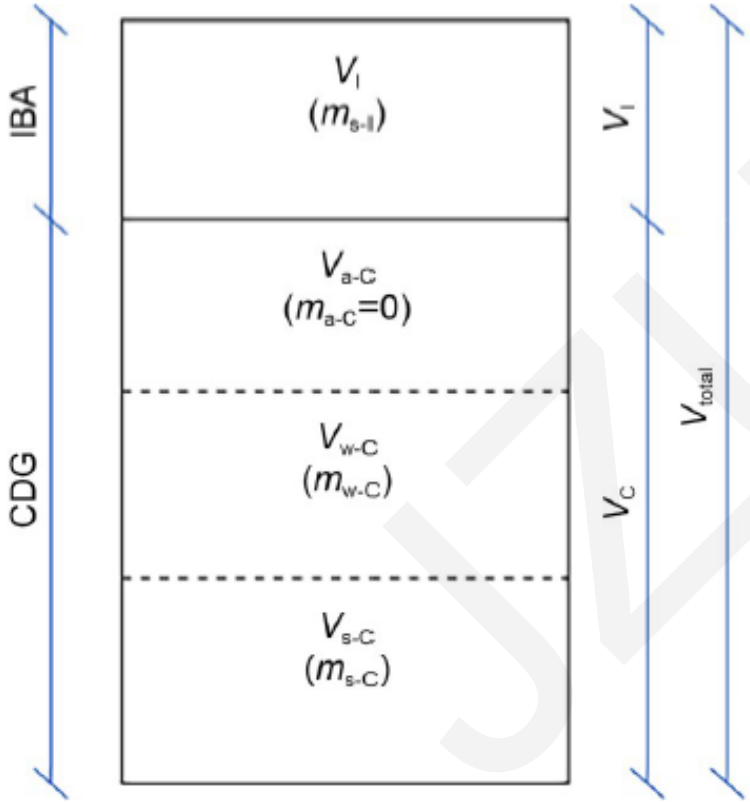
**Monotonic mechanical behaviour of CDG-IBA mixture**

**+**

**Reinforcing mechanism by IBA**

# Volumetric content of IBA

- **To quantify the composition and clearly illustrate the soil structure**




$$f_v = \frac{V_I}{V_{total}} \quad (1)$$

$f_v$ : volumetric content of IBA

$V_I$ : volume of IBA particles

$V_{total}$: total volume of the sample

**Fig. 1. Definitions for soil constituents.**

# Variations of soil shear strength

- A bi-linear increasing trend of peak deviator stress can be observed

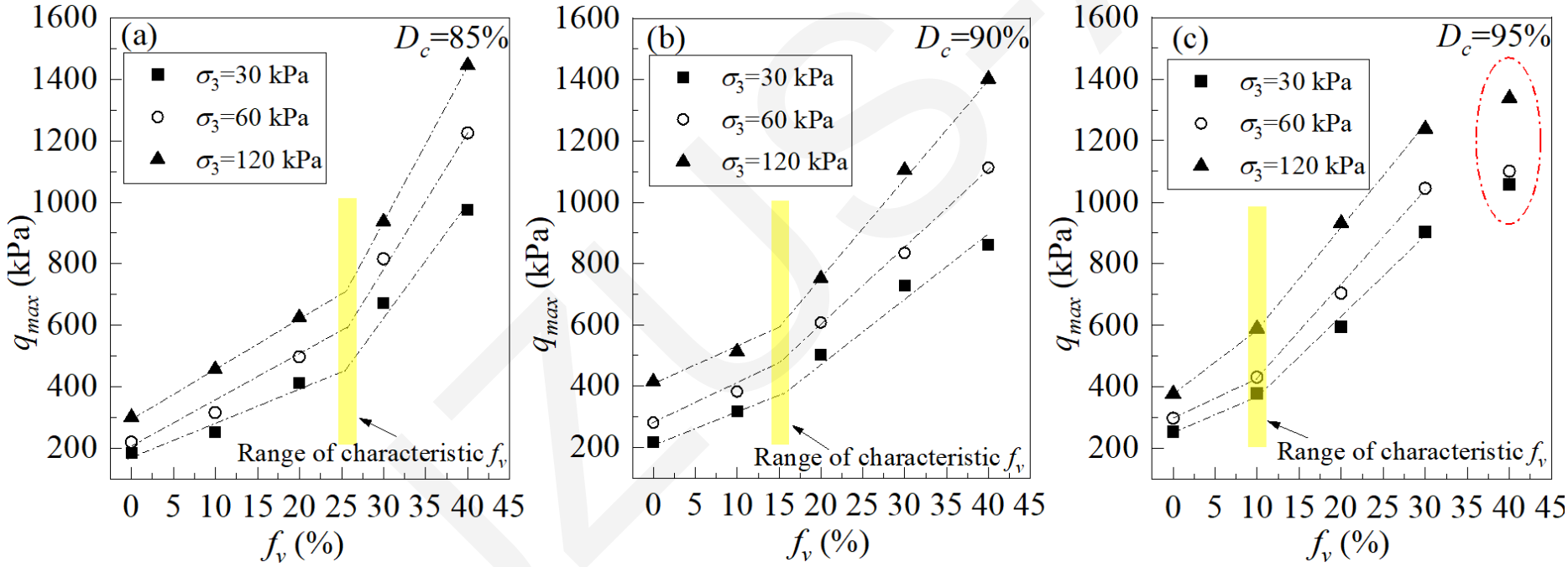



**Fig. 2. Variations of peak deviator stress with $f_v$.**

# Coordination number

- To explain the mechanism of IBA reinforcement

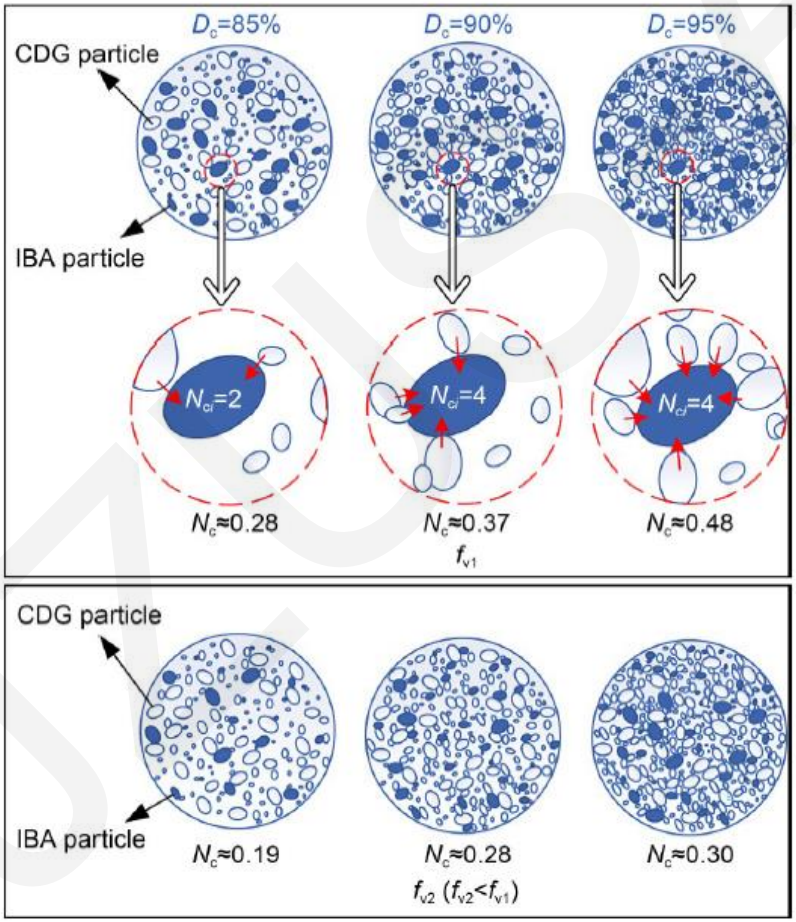



**Fig. 3. Mechanism for reinforcement of CDG soil by the inclusion of IBA particles at two volumetric IBA contents.**

# Conclusions

- Increasing the volumetric content of IBA leads to an increase of the shear strength. This trend becomes more significant after the volumetric content of IBA increases beyond a characteristic value (CDG-CDG contacts dominate before value, CDG-IBA and IBA-IBA contacts are dominant after that). As the compaction degree increases, the characteristic volumetric content of IBA decreases due to the increasing proportion of IBA contacts.
- For practical engineering, increasing either the compaction degree of the CDG or the volumetric content of IBA can help achieve the target strength of the CDG-IBA mixture accordingly.