Chapitre III Les essais pénétrométriques

Ces essais déterminent directement une résistance limite du sol. Les pénétromètres se subdivisent en deux grands groupes : les pénétromètres dynamiques qui sont enfoncés dans le terrain par battage et les pénétromètres statiques (appelés quasi-statiques par certains auteurs), qui sont vérinés dans les terrains à vitesse lente et régulière. L'essai de pénétration au carottier (ou "Essai de Pénétration Standard") occupe une place particulière, bien que s'apparentant sur certains points aux essais de pénétration dynamique.

1. - Pénétromètres dynamiques

Le sondage au pénétromètre dynamique est un moyen de reconnaissance géotechnique qui teste le terrain en place et fournit en tant que tel une caractéristique du sol. Il consiste à déterminer le nombre de coups nécessaires pour enfoncer, selon une procédure définie, une pointe soumise par l'intermédiaire d'un train de tiges à une énergie de battage. L'essai au pénétromètre dynamique permet d'apprécier d'une façon qualitative la résistance des terrains traversés.

Es sont donc recommandés pour résoudre les problèmes suivants :

- le contrôle de l'homogénéité d'une couche,
- la détermination de la succession des différentes couches de terrain,
- la détermination des épaisseurs des différentes couches de sols
- la localisation des cavités ou autres discontinuités,
- la reconnaissance du niveau du toit du rocher ou de la position d'une couche résistante ou d'un bed-rock connu.

I.1. - Domaine d'application

Les essais de pénétration dynamique peuvent être réalisés dans tous les sols fins et grenus dont la dimension moyenne des éléments ne dépasse pas 60 mm.

I.2. - Principe de l'essai

Un sondage au pénétromètre dynamique consiste à enfoncer l'appareil dans le terrain par battage, de manière continue, jusqu'à une profondeur donnée en général limitée par la capacité de pénétration de l'appareil. L'opérateur relève le nombre de coups nécessaires pour enfoncer l'appareil sur un pas de profondeur fixé.

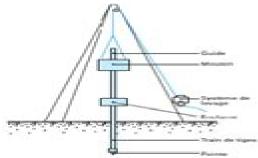


Fig. 1. - Schéma de principe d'un pénétromètre dynamique

1.3. - Description du pénétromètre dynamique

Un pénétromètre dynamique est constitué essentiellement d'un matériel de battage et de guidage, d'un train de tiges, d'une pointe, d'un dispositif de mesure et éventuellement d'un système de détection des efforts parasites.

Le système de battage est composé d'un mouton, d'une enclume, d'un ensemble de guidage, de relevage et de déclenchement de la chute du mouton.

Les tiges de battages sont en acier, elles sont assemblées fermement pour constituer un train de tiges rigidement lié selon un axe rectiligne et continu.

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