



Clean Holes

A must in Chemical Anchoring

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Mechanical and chemical anchors need some form of hole cleaning before they are installed in drilled holes. Mechanical anchors are less sensitive to uncleaned holes because of the mechanisms that make them work. However, chemical anchor performance largely depends on how well the holes were prepared. Tests show that if holes are not properly cleaned prior to chemical application, pullout strength reduction can be as high as 60%.

As shown in *Figure 1*, there are two main mechanisms at play in chemical anchoring, bonding and keying. Relatively, drilled holes are not perfectly smooth, even diamond cored holes. The hole's rough surface enables the creation of micro-interlocks with the hardened adhesive. Supplementing these micro-interlocks is the bonding of the chemical to the hole surface. The

combination of micro-interlocking and bonding defines a chemical anchor's pullout strength.

'Hammer drilling' produces dust while 'wet diamond drilling' produces slurry. These are by-products of drilling that need to be cleaned out prior to chemical injection. *Figure 2* illustrates what happens when a hole is properly cleaned and when drilling by-products are not cleaned out. The uncleaned hole has a noticeable layer of material that prevents the chemical from creating the required micro-interlocking and bonding with the hole surface. This is the reason why there is a significant drop in pullout strength when holes are not properly cleaned. It is therefore imperative that hole preparation be done strictly in accordance with the MII (manufacturer's installation instructions).

Figure 1. Chemical anchors working through a combination of keying and bonding.

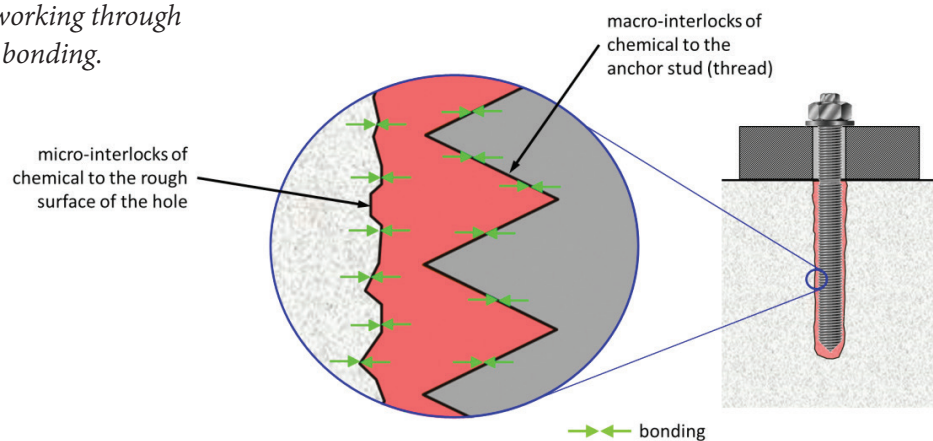


Figure 2. The difference between well cleaned and un-cleaned holes

