

information on time dependent soil resistance effects is presented in Section 7.2.4 and approximate waiting periods for various soil types is noted in Section 14.5.2.1. When time dependent soil strength changes occur, care has to be taken to assess the driving criterion for the soil condition at the end of driving. For example, if soil setup results in a 50% increase of nominal resistance from the end of driving to the time of an acceptable setup period, then piles may be driven to a blow count that produces the required nominal resistance divided by 1.5. Obviously, this reduced driving criterion may result in substantial savings compared to driving the piles to the full nominal resistance. Restrike tests should be performed on a representative percentage of production piles to substantiate that the anticipated soil setup occurs over the site. A contingency plan should also be in place in the event restrike results indicate less than required nominal resistance, such as performing a second longer term restrike or driving piles to a greater penetration depth.

17.2 PRACTICAL AND ABSOLUTE REFUSAL

As noted above, agencies sometimes use practical refusal as a driving criteria. Definitions for practical and absolute refusal are based on an approved hammer system operating properly at its maximum fuel or stroke setting unless hammer approval was established based on hammer operation at a reduced fuel or stroke setting. If refusal driving conditions develop in combination with suspect hammer performance, further evaluation of hammer energy transfer and the source of the refusal driving conditions are appropriate.

Practical refusal is defined as a pile penetration resistance (blow count) of 10 blows per inch for a maximum of 3 consecutive inches of pile penetration. Practical refusal is often used as a criterion for piles driven to a consistent and hard bearing layer. Blow counts greater than 10 blows per inch should be used with care for concrete piles and should be avoided for timber piles. Absolute refusal is defined as 20 blows for one inch or less of pile penetration. Driving should terminate immediately once either criteria are achieved with a properly sized and properly working hammer.

Practical and absolute refusal criteria should be used to avoid driving for an extended duration at excessively high and unreasonable blow count requirements. When seating a pile on hard rock, an absolute refusal criterion of 5 blows per $\frac{1}{4}$ inch or 10 blows per $\frac{1}{2}$ inch may be preferred to 20 blows per inch to reduce the risk of pile toe or driving equipment damage.

When the required pile penetration depths cannot be achieved by driving without exceeding practical or absolute refusal criteria with the approved hammer, use of