surfactant and a β-naphthalene sulphonate formaldehyde condensate.

US 4442018 discloses the composition of an additive for the production of a stable foam in aqueous phase consisting of an acrylic acid polymer, a C12-C14 and C16 alcohol, a C4 and C5 alcohol, sodium lauryl sulfate or alpha-olefin sulphonate, and water.

Description of the invention

The present invention relates to the use as conditioning foaming additive of a salified alkyl ether sulphate having a straight or branched C7-C11 alkyl chain and a degree of ethoxylation ranging between 4 and 9 as conditioning agent able to generate foam during mechanised soil excavation with a TBM. The additive, in liquid, paste or powder form, generates foam when added in percentages of 0.1-4% by weight to an aqueous solution used on the tunnel face to soften the soil and allow faster extraction, and in the conditioning chamber to maintain the stability of the tunnel face.

The use of a salified alkyl ether sulphate having a branched C7-C11 alkyl chain and a degree of ethoxylation of 7-9 is preferred. The alkyl ether sulphate is preferably a sodium or potassium salt.

The salified alkyl ether sulphate can be used in addition to an aqueous solution in a percentage by weight of 0.1-4.0%.

The salified alkyl ether sulphate can also be used in admixture with one or more surfactants selected from acyl glutamates and alkyl polyglucosides, in particular in admixture with an acyl glutamate selected from cocoyl glutamate, lauroyl glutamate, myristoyl glutamate, capryloyl glutamate, caproyl glutamate and the sodium salts thereof or in admixture with an alkyl polyglucoside selected from decyl glucoside, capryl glucoside, lauryl glucoside and cocoyl glucoside. Lauroyl glutamate, in particular in the form of sodium salt, and capryl glucoside, are particularly preferred.

The percentages by weight of the total surfactant(s) present in the conditioning additive can range from 30 to ~~100~~85% for alkyl ether sulphate, 0 to 50%, preferably 5 to 50%, for acyl glutamates, and 0 to 50%, preferably 10 to 50%, for alkyl polyglucoside, obviously on the proviso that the total is 100.