alternative to the other conversion process; an example, cycle oils, which cannot be recycled to extinction in the catalytic cracker, can be processed in the hydrocracker.

Notwithstanding many extensive comparisons between the various processes, the experince shows the generalisation with respect to the optimum conversion route still cannot be made.

Process description

All hydrocracking process are characterised by the fact that in a catalytic operation under relatively high hydrogen pressure a heavy oil fraction is treated to give products of lower molecular weight.

Hydrocracking covers widely different fuels, ranging from C3/C4 production from naphta, on the other hand, to luboil manufacture from deasphalted oils, on the other.

Most hydrocrackers use fixed beds of catalyst with downflow of reactants. The H-Oil process developed by Hydrocarbon Research Corp and Cities Service R & D employs an ebullient bed reactor in which the beds of particulate catalyst are maintained in an ebullient or fluidised condition in upflowing reactants.

When the processing severity in a hydrocracker is increased, the first reaction occuring leads to saturation of any olefinic material present in feedstock. Next comes the reaction of desulphurisation, denitrogenation and de-oxygenation. These reactions constitute treating steps during which in most cases, only limited cracking takes place. When the severity is increased further, hydrocracking reaction is initiated. They proceed at various rates, with the formation of intermediate products (eg. saturation of aromatics), which are subsequently cracked into lighter products.

Process configuration

When the treating step is combined with the cracking reaction to occur in one reactor, the process is called a SINGLE-STAGE PROCESS.

Single-stage process

In this simplest of the hydrocracker configuration, the lay out of the reactor section generally resembles that of hydrotreating unit. This configuration will find application in cases where only moderate degree of conversion (say 60% or less) is required. It may also be considered if full conversion, but with a limited reduction in molecular weight, is aimed at. An example is the production of middle distillates from heavy distillate oils. The catalyst used in a single-stage process comprises a hydrogenation function in combination with a strong cracking function. The hydogenation function is provided by sulphided metals such as cobalt, molybdenum and nickel. An acidic support, usually alumina, attends to the cracking function. Nitrogen compounds and