RIGID AND FLEXIBLE PAVEMENT

As gearpins said, surfaced pavement types can be categorized into two groups, flexible and rigid. Flexible pavements are those which are surfaced with bituminous (or asphalt) materials. These types of pavements are called "flexible" since the total pavement structure "bends" or "deflects" due to traffic loads. A flexible pavement structure is generally composed of several layers of materials which can accommodate this "flexing". On the other hand, rigid pavements are composed of a Portland Cement Concrete (PCC) surface course. Such pavements are substantially "stiffer" than flexible pavements due to the high modulus of elasticity of the PCC material. Further, these pavements can have reinforcing steel, which is generally used to reduce or eliminate joints.

SUBGRADES

The loads imposed upon a pavement and the weight of the pavement itself are ultimately carried by the layer beneath the pavement – the subgrade (think "the soil"). The pavement structure is designed so that the loads imposed by the aircraft are spread sufficiently to avoid exerting too much pressure on the subgrade. The amount of pressure which the subgrade can support differs according to the subgrade type. This is why, for example, a pavement to carry a certain aircraft will be thicker on a soft clay soil than on compacted gravel.

In the flexible pavement design system used by most airports, subgrade strength is measured by the CBR test. In the rigid pavement design system used by most airports, subgrade strength is measured by the modulus of subgrade reaction (or K value). A trained airport engineer can make a credible field estimate by peeing on the soil and then kicking it, which might be analogous to the trained pilot assessing an aircraft's airworthiness by kicking the tyres.

A weak subgrade like soft clay is class D, and has a CBR strength of below 4 or a K value less than 25 MN/cu.m. A strong subgrade like a gravel is class A, has a CBR strength of above 13 for flexible pavements or a K value above 120 MN/cu.m for rigid pavements.

LCN and ACN

These are not the same system. LCN is the old system, and it was in use from 1956 to 1983 by ICAO, then ACN replaced it. So I guess the old ATPL exams probably had LCN included.

With LCN, the allowable aircraft weight not only depends on the airplane characteristics, but also on pavement thickness (t) for flexible pavements and radius of relative stiffness for rigid pavements. A resulting effect of this feature is that the airplane LCN is dependent upon pavement factors, and consequently it changes from pavement to pavement. This requires that the airplane LCN be published only in the form of a set of charts, and not as a table as is ACN, due to the many combinations of aircraft characteristics and

pavement thickness or radius of relative stiffness. The majority of airport authorities who publish still LCN as their pavement rating do not include thickness or stiffness in their rating, thus making it virtually impossible to determine an accurate pavement strength from the published ratings as it relates to allowable weight of an aircraft. The United Kingdom practice introduced Load Classification Group (LCG), which also contained LCN numbers that, although called the same as the ICAO standard LCN, contain values that are different due to a different method of calculation. So UK LCG/LCN ain't ICAO LCN ain't ACN.