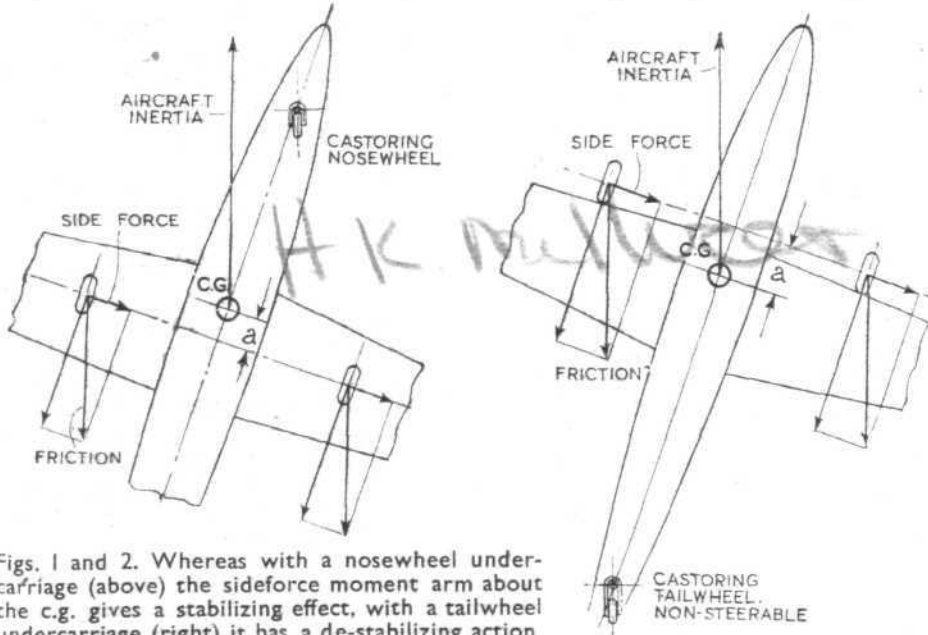


With a slightly longer fuselage, the Varsity T.I crew-trainer is essentially a tricycle development of the Valetta military transport.

providing that incidence without incurring a high drag penalty for the cruising condition. The landing run should, in general, be somewhat better for nosewheel aircraft as a result of higher braking efficiency—except, perhaps, for very light aircraft not equipped with brakes and flaps. There may, however, be a difference in the tail-down incidence between the two undercarriage configurations which would result in lower landing speeds on the tailwheel types. As few people bother to make a three-point landing nowadays—aircraft are usually “wheeled-in”—this eliminates the incidence advantage of the tailwheel type. Nevertheless, a nosewheel permits the pilot to apply the brakes hard, whereas similar action on a tailwheel aircraft can incur the danger of nosing-over.

On large aircraft equipped with tricycle undercarriages, the wing can be positioned at an angle of incidence reasonably close to the incidence required for landing safety-



Figs. 1 and 2. Whereas with a nosewheel undercarriage (above) the sideforce moment arm about the c.g. gives a stabilizing effect, with a tailwheel undercarriage (right) it has a de-stabilizing action.

speed. Furthermore, the elevator can be made powerful enough to cope with the ensuing pitching moment, providing that an appropriate fore and aft location of the undercarriage relative to the c.g. is used (Fig. 3). The fact that braking airscrews can be used on tricycle types without danger of tipping back is due to the fact that the resultant of the horizontal inertia forces is not far vertically from the thrust and drag line, and the magnitude of these factors is equal during the deceleration.

In making a comparison between nosewheel and tailwheel undercarriages from the structural viewpoints, it has to be admitted that the nosewheel type is the more difficult to deal with. Having a shorter wheelbase, it has to withstand greater loads—more especially in landing cases, when the loads can be as much as twice those that a tailwheel assembly would be called upon to accommodate. The full brake-application load-capacities

specified by the Air Registration Board for tricycle undercarriages are, in fact, worse than the manoeuvring loads on aircraft equipped with tailwheel landing gear. With high-wing aircraft, for example, the taxiing loads are 45 per cent higher for a tricycle layout than the manoeuvring loads on a tailwheel type. As to landing loads—which are usually the most critical—although the A.R.B. vertical velocities of descent are the same for both types of undercarriage up to a stalling speed of 50 m.p.h., the energy absorption coefficients are approximately 100 per cent higher for the nosewheel type. It is, in fact, true to say that nosewheel loads are, in general, about double the value of tailwheel loads when the leg lengths are the same. But the very fact that nosewheel struts are, as a rule, considerably longer, means that the loads they are called upon to bear are, at the very least, twice as large as those for the corresponding tailwheel units.

Other structural considerations involve static and dynamic stability on the ground. Here, it must be said that, owing to the main wheels trailing aft of the centre of gravity, the tricycle layout—with, of course, a castoring nosewheel—is inherently statically stable, whereas the tailwheel undercarriage is inherently statically unstable. Consequently, the nosewheel undercarriage is essentially an anti-ground-loop configuration (Fig. 1) as compared with the tailwheel layout (Fig. 2). An examination of the tricycle aircraft in side elevation also



The immediate post-war Viking makes use of the conventional tailwheel configuration of its Wellington and Warwick forebears.