

From Dr. Antony M. Segal

### **K-13 Impact Test - Nosewheel or Skid?**

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A series of impact tests have been carried out on a full-size K13 fuselage, at the Centre for Human Sciences, QinetiQ, Farnborough. Two Hybrid 111 pilot manikins were seated in the glider. The test simulated a heavy landing accident onto the nose of the glider.

It was found that the impact load on the spine of the pilots was greatly reduced if the glider was equipped with a nosewheel rather than with a landing skid.

The following table summarises the findings:

#### **FRONT PILOT MANIKIN.**

|                   |        |        |        |        |
|-------------------|--------|--------|--------|--------|
| Drop Height:      | 150mm  | 300mm  | 450mm  | 600mm  |
| Lumbar Spine Load |        |        |        |        |
| WHEEL             | 1019 N | 2564 N | 3269 N | 3529 N |
| SKID              | 3099 N | 4185 N | 4559 N | 5028 N |

#### **REAR PILOT MANIKIN**

|                   |        |        |        |        |
|-------------------|--------|--------|--------|--------|
| Drop Height:      | 150mm  | 300mm  | 450mm  | 600mm  |
| Lumbar Spine Load |        |        |        |        |
| WHEEL             | 636 N  | 1330 N | 1667 N | 1890 N |
| SKID              | 1709 N | 2671 N | 2629 N | 3774 N |

Yamada has produced the following figures for the breaking load of the lumbar spine in compression according to age:

20-39 years - 7140 N  
40-59 years - 4670 N  
60-79 years - 3010 N

I consider that that nosewheel configuration could change an accident with the potential to cause a spinal fracture into one where no fracture occurs. Similarly, an accident with the potential to cause a serious spinal fracture could be changed into one involving a minor spinal injury only.

These findings were discussed at a meeting of the BGA Safety Committee on the 12th November 2005. Owing to the relatively high cost of the modification and the low value and age of most K-13s, it was decided the decision as to whether to change skid-equipped gliders to a nosewheel configuration should be left to each individual gliding club.

A full report, on the test may be found in "Sailplane & Gliding", August-September 2005, pages 26-28,

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