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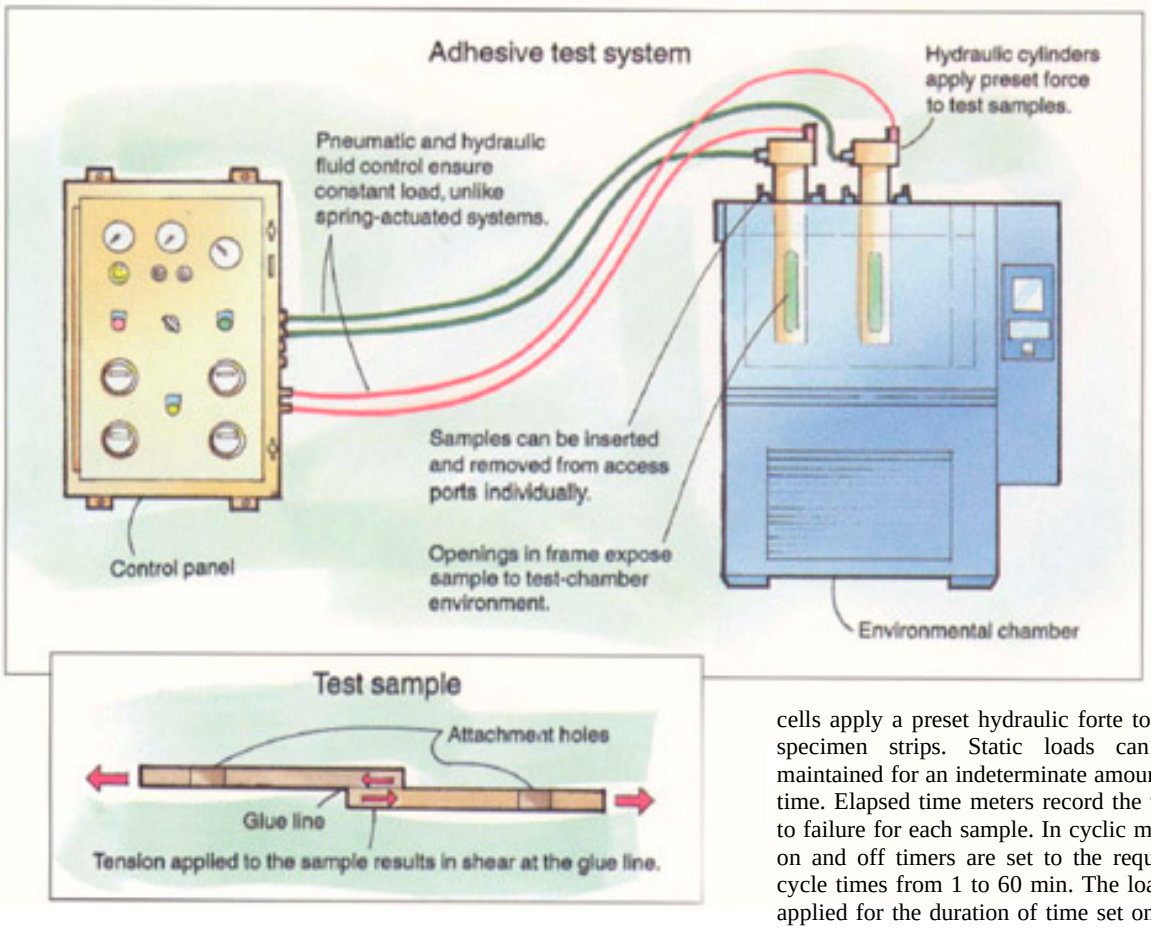
# *Hydraulic system tests hot, wet adhesives*




Weight savings, more even stress distribution, and a smoother surface finish are reasons that aircraft manufacturers would like to use adhesives for primary structural bonds. But while adhesives may be strong enough under good conditions, planes require bond durability over a 30-year lifespan that includes exposure to a variety of extreme environments. Testing under these conditions presents two problems. The system must be able both to expose the load cell to the harsh conditions and to compensate for stress losses in the joint due to creep relaxation of the adhesive.

Biach Industries, Cranford, N.J., has designed systems for adhesive testing in wet and hot environments under both static and cyclic loading. In static mode, the load cells apply a preset hydraulic forte to test specimen strips. Static loads can be maintained for an indeterminate amount of time. Elapsed time meters record the time to failure for each sample. In cyclic mode, on and off timers are set to the required cycle times from 1 to 60 min. The load is applied for the duration of time set on the on timer, then released for the duration set on the off timer, and the cycle repeats until failure. Elapsed time meters for each sample record only during the time which the load is applied. In both modes, multiple samples can be tested simultaneously, and the system will shut itself down when all specimens have failed. Under loading, adhesive joints can relax due to creep, which can reduce loads applied by spring-actuated systems. The Biach systems use accurately controlled hydraulic pressure to ensure constant load. Thus, true static and dynamic stress effects can be measured, exclusive of the effects of creep.