



Bond stress highest on the corners

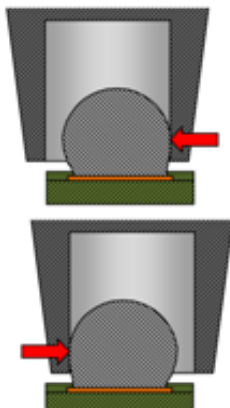


Board warpage by CTE miss match or mechanical bending

Fatigue test

- Impact and low load rate fatigue
- Crack propagation analysis
- Button testing
- Sensor accuracy $\pm 0.075\%$
- Simulated Fatigue effects of thermal cycling and CTE miss match
 - Board drop/bend/vibration

Fatigue shear, pull and push tests of one or multiple bonds Programmable strain, impact energy and rate of strain



Solder ball fatigue shear

There are a few basic types of fatigue test. The sample can be subjected to repeated shear, pull or push loads. In the case of shear these can also be applied with a low rate of load application or with a high "Impact" rate. These tests can simulate many fatigue loading conditions with advantage that the load, energy and strain can be selected and recorded for every load cycle. Finally the number of cycles to failure is recorded.

One example is the fatigue loading of a BGA solder ball when the board it is mounted to bends either due to CTE miss match or mechanical loading. For low load rate applications like CTE miss match the shear component of the oscillating load can be simulated with a tubular or double (fork) shear tool. The tool deflects the ball under test through repeated alternate strains until

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Bond testers

- Condor *Sigma*
- Condor *Sigma Lite*
- Condor *Sigma W12*
- Condor *150HF*

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Technology leader in bond testing worldwide

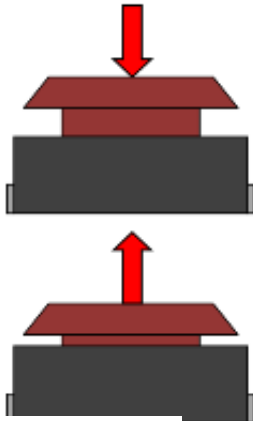


failure occurs. Failure being defined by a minimum peak load resistance on the tool for each load application. For high load rates an impact tool can be used.

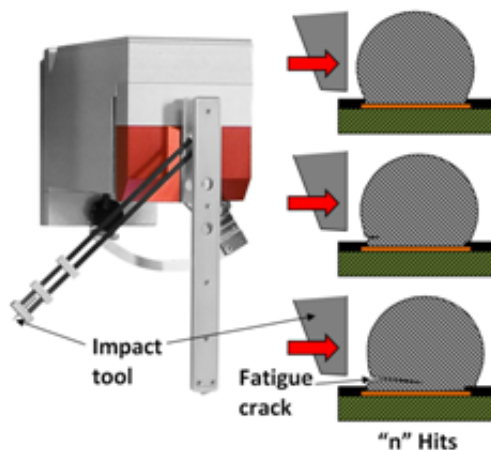
High speed video of one impact fatigue loading

[Video not included in PDF: [click here to view online](#)]

Oscillating Pull and Push test have many applications, one example being button life tests. With such tests a force displacement graph can be recorded providing useful information on the actuation characteristics and how these may change after multiple operations.



Fatigue push/pull



Impact fatigue

Relevant products

- Condor Sigma
- Condor Sigma Lite
- Condor Sigma W12
- Condor 150HF
- Revolving Measurement Unit

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- Sensors
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- Vision
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- Calibration
- Work holders

Increase your bondtesting throughput

The **Condor Sigma** is not only the most accurate bondtester in the world, but also the fastest. [Click here to read the study that proves the Condor Sigma is up to 39% faster than the competition.](#)

Special applications

Please [contact us](#) if you have any questions or special bond testing requirements.

Condor Sigma brochure

[Click here](#) to download the **Condor Sigma brochure**, the **Condor Sigma W12 brochure** or the **Condor Sigma Lite brochure** or the **Condor Sigma Vision brochure (PDF)**.

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