

ASPE Meetings

27th ASPE Annual Meeting
 Summer Topical Meeting - Precision
 Engineering and Mechatronics
 Supporting the Semiconductor
 Industry

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Dear Colleague:

Our plans for 2012 include a Summer Topical Meeting from June 24-26 in Berkeley, CA on the subject of *Precision Engineering and Mechatronics Supporting the Semiconductor Industry*. This topic was last covered in 2008 and brought together over 100 attendees from Europe, Asia and the US. The organizing committee is planning a tutorial on Precision Motion Control and Thermal Effects on Sunday, June 24 and a strong set of papers on Monday and Tuesday. See the [website](#) for more information and a list of the papers.

The Annual Meeting this year will be in La Jolla, CA, just north of San Diego, from October 21-26, 2012. The technical conference and tutorials offer you the opportunity to learn, grow professionally, expand your network and enjoy a time to rejuvenate in the many recreational activities within and near the city. Dinner will be held on the USS Midway where our own Dan Luttrell landed his A6 a few hundred times. Dan will talk about his experiences at the Meeting. Visit the [website](#) to find more program information.

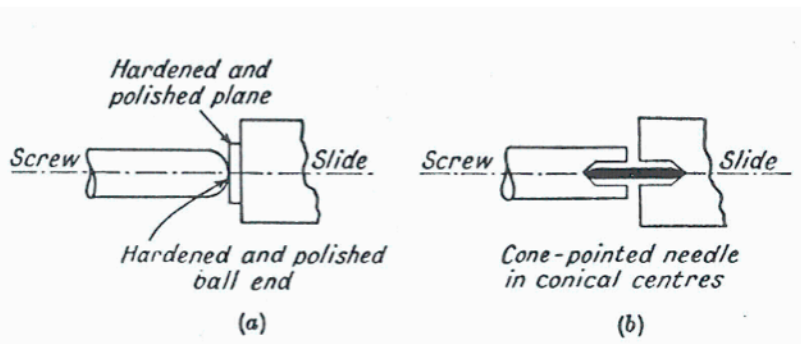


I look forward to seeing you again at an ASPE Meeting in 2012.

Tom Dow, Executive Director

PATTERN #8: KINEMATIC DRIVES [1]

The coupling of unwanted degrees of freedom between a thrust element and the corresponding driven element produces undesired motion of the driven element. This is due to the finite stiffness of the coupling in the unwanted direction of motion. From the simple spring equation, $F=Kx$, if the coupling has a force component along one of the unwanted degrees of freedom, a displacement will occur. An example [2] is a micrometer pushing against a linear stage shown in (a) below. Runout of the screw will produce a vertical force on the slide. If a wobble pin is added as shown in (b), the vertical component of force decoupled and only the horizontal force is transmitted to the stage. Even with these apparently good approaches, one must be alert for unexpected problems arising due to friction in the coupling elements.



A review of the designs for decoupling motor drives for audio turntables will provide the reader with many of the legendary approaches taken by that community to address the problem. Linear motors also reduce the coupling effect but introduce their own problems such as force variation from non-uniform coil windings.

PATTERN #8:

Design and construct the stage drive system such that the required degree of freedom and only this degree of freedom is coupled between the drive mechanism and the moving element.

Next pattern: **PROBE KNOWLEDGE**

[1] Based on "Patterns for Precision Instrument Design," a classic ASPE tutorial by C. Teague, C. Evans (and later D. Swyt) that identifies 12 mechanical concepts or patterns that drive precision in fabrication, assembly

and metrology.

[2] From Haddick, H.J.J, The physics of experimental method, Chapman and Hall, London, 1963.

The **American Society for Precision Engineering** promotes the future of manufacturing in America by advancing precision engineering through supporting education and encouraging the development and application of precision principles.

ASPE, founded in 1986, is a non-profit organization.

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