

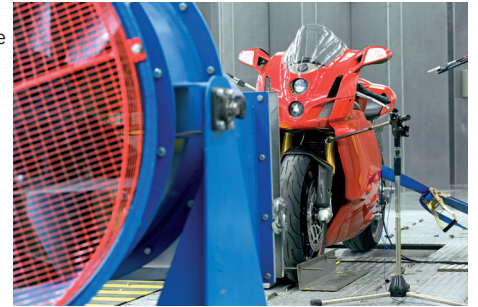
Torsional Vibration - Measurement & Analysis

April 5, 2011, Coventry

LMS cordially invites you to join us for an informative and educational day covering the basics of rotating machinery. More than ever, the engineering of rotating equipment is under pressure to deliver better performance with reduced noise/vibration and increased durability.

This free seminar can help you answer questions like:

- What is an Order? How does it help identify noise and vibration issues?
- What is Torsional Vibration? What type of problems does it cause, and how can they be solved?
- Can viewing data in degrees/revolutions, rather than time/frequency, give additional insight into noise and vibration issues?
- What kinds of unique problems do gears and bearings have? How can they be analyzed and solved?
- What are the unique issues for pumps and electric motors? How can one diagnose a frequency spectrum to determine the issue?
- Can I identify and resolve rotating machinery issues before building physical prototypes, or even before CAD creation?



Agenda

09:00	Registration and welcome		
09:30	Order Analysis and Tracking		
	<ul style="list-style-type: none">• What is an order? How is it calculated?• How is it measured and simulated?• Review of orders generated by common equipment		
11:00	Break		
11:15	Torsional vibrations		
	<ul style="list-style-type: none">• What is torsional vibrations?• How is torsional vibration measured? (Pulse-per-revolution requirements, sensors, etc)• How to analyze?• Examples of Torsional Vibrations: Drivelines, engines• Lumped Parameter Modeling of Torsional Vibration		
12:30	Lunch		
13:30	Gears, Bearings, Pumps and Electric Motors		
	Gears		
	<ul style="list-style-type: none">• Gear Mesh Frequency• Transmission Error• Sideband Analysis: Eccentric Gears, Off-Center Rotation		
	Bearings		
	<ul style="list-style-type: none">• Inner Race, Outer Race and Rolling Element Pass Frequencies• Defect Detection via Envelope Analysis		
	Electric Motors		
	<ul style="list-style-type: none">• AC vs DC Motors• Motor Controllers: Pulse Width Modulation and Rectifiers		
		Hydraulic Pumps	
		<ul style="list-style-type: none">• Types of Pumps (Vane, etc.)• Cavitation	
		15:30	Break
		15:45	Balancing and Angle Domain
			Balancing
			<ul style="list-style-type: none">• Imbalance: Mass versus speed effects• Influence Coefficients• Shaft Centerline plots
			Angle Domain
			<ul style="list-style-type: none">• Angle versus Time: Advantages• Viewing data in Degrees, Revolutions or Cycles• Incremental encoders and other measurement methods• Practical Examples: Piston Slap, Pilot Ignition in Diesels, Spark Timing, etc
			Resonance Issues
			<ul style="list-style-type: none">• What is a resonance? How are they identified?• Operational Deflection Shapes• CAE and Test Correlation• Accessory bracket and isolator resonances
		17:00	Closure

→ Registration on www.lmsintl.com/seminar/uk-torsional-vibration-measurement-analysis