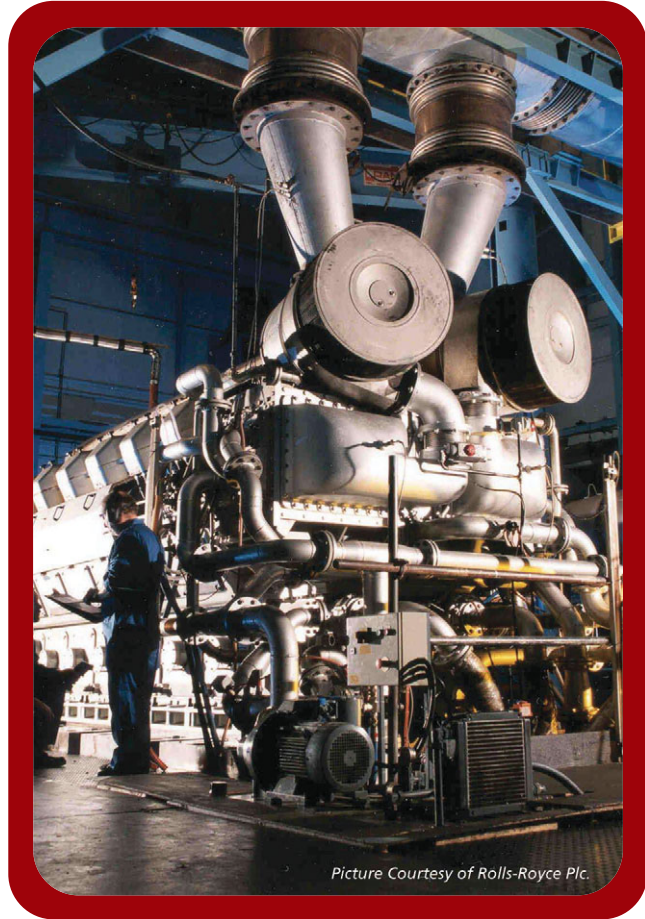


OPERATING DEFLECTION SHAPES










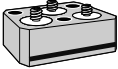


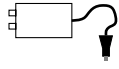


Operating Deflection Shapes (ODS) are used for visualisation of the vibration pattern of a structure under given operating conditions. Vibration measurements are performed at different points and directions (degrees of freedom, DOFs) on the structure and the vibration pattern can be shown as an animated geometry model of the structure or listed in a table.

ODS Test Consultant Type 7765 is an application that supports setup and measurement in stationary or almost stationary conditions. The ODS at different spectral components are subsequently extracted and shown.

The rotation speed, analysis of its stability and order spectra (using tracking) can be obtained using Order Analysis Type 7702. Order spectra provide elimination of smearing of spectral components in cases of instability of machine speed.



Picture Courtesy of Rolls-Royce Plc.

Calibrator	Uniaxial Accelerometers	Triaxial Accelerometers
 4294 Calibration Exciter	 DV 0460  DV 0459 Calibration Clips	 IEPE TEDS 4506B-00X
 MM 0012  MM 0024	 PE 4393  IEPE 4394  8329 Laser Doppler Vibrometer	 PE 4326A  IEPE TEDS 66A11  66A12
 WQ 2350 Cigarette Lighter Tacho  UA 0801 Lightweight Tripod	 2647A, B, C TEDS PE to IEPE Converter	020233

HARDWARE ACCESSORIES

UA 1407, UA 1408 Set of 100 Mounting Clips
UA 1563, UA 1564 Set of 5 High Temp. Mounting Clips
UA 1077 Set of 5 Mounting Magnets, M3
UA 0642 Set of 5 Mounting Magnets, 10/32

UA 1216 Set of 10 Insulation Studs, M3-M3
UA 1215 Set of 10 Insulation Studs, 10/32-10/32
WA 0224 Set of 5 Insulating Mechanical Filters, M3-M3
UA 0553 Set of 5 Insulating Mechanical Filters, 10/32-10/32

TYPE 3560 C-S25

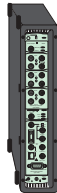
Operating Deflection Shapes (2 In)

- 3560 C
- 3032-A
- 7770-N2
- 7754 G
- 7765
- 7533

ODS measurements based upon FFT spectra using 2-channels. Useful in case of:

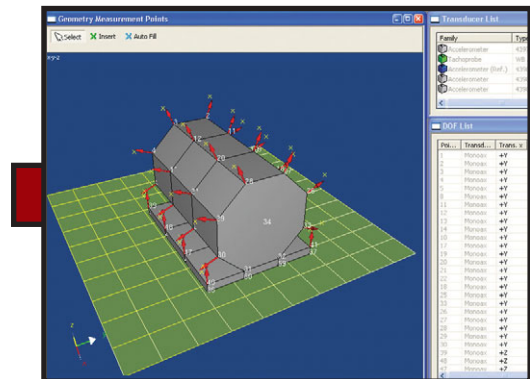
- Stable machine speed
- Analysing lower spectral components

Order Analysis Type 7702 option is recommended in cases of slight instability of machine speed and/or analysis of higher orders.



* One year SW maintenance

ODS Test Consultant guides the user through the measurement and validation process. This shows an example of the positions and directions of the response measurements on the structure



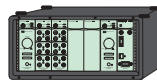
TYPE 3560 D-S18

Operating Deflection Shapes (12 In)

- 3560 D
- 7536
- 2 x 3032-A
- 7770-N12
- 7754 G
- 7765

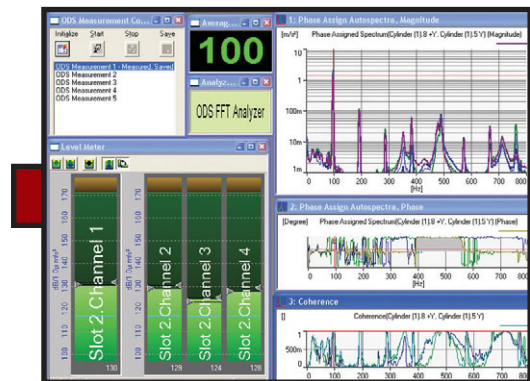
ODS measurements based upon FFT spectra as above, but for up to 12 channels. Useful as above but with additional advantages such as:

- Simultaneous response measurements in more DOFs
- Shorter test time
- Higher consistency in data



* One year SW maintenance

Measurement of phase assigned spectra, providing the spectral ODS results. The coherence function is used for validation of the measurements. Frequency spectra or order spectra can be used



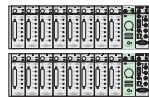
TYPE 3560 E-S8

Operating Deflection Shapes (96 In)

- 2 x 3560 E
- 2 x 7536
- 16 x 3032-B
- 7770-N16
- 7754 G
- 7765

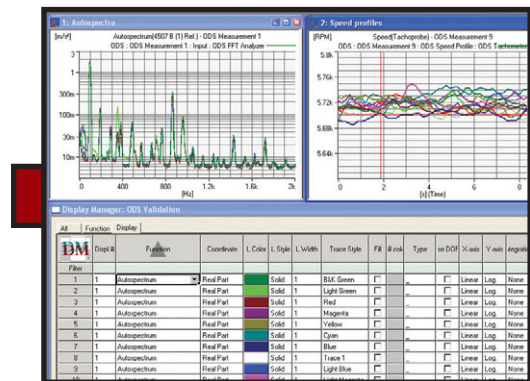
ODS measurements based upon FFT spectra as above, but for up to 96 channels. The basis of an ODS system when measuring in many DOFs and simultaneous data acquisition in all DOFs is required. This provides:

- Shortest possible test time
- Highest consistency in data



* One year SW maintenance

Validation of the measurements. Overlay plots of the speed profiles and the spectra at the reference positions for each of the measurements show the degree of stationarity of the machinery under test



The ODS of a spectral component can be shown as an animated wireframe or colour contour or as an ODS shape table in terms of acceleration, velocity and displacement

DOFs	Shape 1 Accel. (m/s ²)	Shape 1 Vel. (m/s)	Shape 1 Disp. (m)
+1Y:-1Y	1,0342E-3	605,17E-9	354,1E-12
+2Y:-1Y	14,081E-3	8,239E-6	4,8209E-9
+3Y:-1Y	6,3629E-3	3,7231E-6	2,1785E-9
+4Y:-1Y	12,311E-3	7,2037E-6	4,2151E-9
+5Y:-1Y	40,855E-3	23,905E-6	13,988E-9
+6Y:-1Y	6,2645E-3	3,6656E-6	2,1448E-9
+7Y:-1Y	8,3601E-3	4,444E-6	2,444E-9
+8Y:-1Y	10,026E-3	5,444E-6	2,944E-9
+26Y:-1Y	74,644E-6	4,444E-6	2,944E-9
+27Y:-1Y	435,42E-6	2,444E-6	1,444E-9
+28Y:-1Y	458,8E-6	2,444E-6	1,444E-9
+29Y:-1Y	329,92E-6	1,444E-6	9,444E-10
+30Y:-1Y	1,0429E-3	6,444E-6	3,444E-9
+31Y:-1Y	334,81E-6	1,444E-6	9,444E-10

- SW ACCESSORIES**
- 7702 Order Analysis
 - 7769 Auxiliary Parameter Logging
 - 7701 Data Recorder
 - 7705 Time Capture
 - 7789 Time File Management
 - 7773 Envelope Analysis
 - 7767 Data Manager

- SW UPGRADING ACCESSORIES**
- 7707 Unlimited Analysis Engine
 - 7700-Nnn Noise and Vibration Channel Licenses
 - 7770-Nnn FFT Analysis Channel Licenses
 - 7771-Nnn CPB Analysis Channel Licenses