

Introduction

For each measurement, the measurement result is stored in the form of a TDX file in ASCII format. Here all properties are documented in the ****HEADER** area, all constant measurement parameters in the ****CONSTANSTS** area, the measurement channels in the ****MEASURCHANNELS** area and the measurement data in the ****MEASURDATA** area. ****END** denotes the end of the file. The formatting and use of keywords allows the software-supported use of the measurements in the simulation. Basically, a time column is always output for each measurement, which makes the temporal excitation for the simulation verifiable.

General information

The TDX file is divided by the keywords into sections, each to be separated by a blank line:

**HEADER	
**COMMENTS	
**PLOTHEADER	
**PLOTTITLE	
** CONSTANSTS	
** MODELPARAMETERS	
** MEASURCHANNELS	
**MEASURDATA	
**END	

Each section is described with a specific formatting:

**HEADER	10 char key, 40 char description, n char Value free formatting
**COMMENTS	free formatting
**PLOTHEADER	free formatting (optional)
**PLOTTITLE	free formatting (optional)
** CONSTANSTS	10 char key, 30 char description, 10 Char Unit, n char value
** MODELPARAMETERS	10 char key, 30 char description, 10 Char Unit, n char value
** MEASURCHANNELS	10 char key, 30 char description, 10 Char Unit, n char value (columnvalue+b)*a+c
**MEASURDATA	Per MEASURCHANNEL one column separated by spaces
**END	

The different measurement types should be delivered in a clear file structure:

TDX_BRAKE
TDX_STEERING
TDX_LATSTIFF
TDX_LONGSTIFF
TDX_VERTSTIFF
TDX_TORSIONAL
TDX_PARKING
TDX_CLEAT
TDX_CLEAT_ANGLE

Each TDX file should follow a uniform naming convention that includes the measurement type as well as the measurement parameters:

Type	Wheelload	Inflation	CleatHeigthCleatLength	Cleatangle	velocity	.tdx			
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Individual documentation

The following data should be entered in the HEADER area, which have reference to the test bench

**HEADER		
RELEASE	Release of TYDEX-Format	1.3
MEASID	Measurement ID	Cleattyp
SUPPLIER	Data Supplier	Test tig
DATE	Date	TT.MM.JJ
CLCKTIME	Clocktime	HH:MM
PROCTYPE	Test_procedure_type	(cleat)
CUSTOMER	Measurement Company	XXX

The following data should be entered in the COMMENTS area, which have reference to the current test

** COMMENTS	
Tire manufacturer Brand name Width/height ratio R Rim radius LI Speed symbol Internal pressure Specific number e.g. Cleat test on 10x20 TRANSV cleat at 3, 5199N, 0° camber, 2.5 bar Tire_company_name Tire_name 255/40 R22 103Y 2.7bar PARTNO Part_number_addon VA2749192U	

The following data describing the measured tire should be entered in the PLOTHEADER area

** PLOTHEADER		
Tire manufacturer Brand name Width/height ratio R Rim radius LI Speed symbol Internal pressure e.g. Tire_company_name _Tire_name _255/40_R22_103Y 2.7bar		

The following data should be entered in the PLOTTITLE area, describing the current measurement and used as a title for a plot

** PLOTTITLE		
CLEAT_9357N_2k7bar_20x20mm_45deg_60kmh		

The following keywords must be entered in the CONSTANTS area for each measurement file.

**			
**CONSTANSTS		-	
FILE	original_measurefile	-	filename
NOMWIDTH	Nominal_section_width	mm	275
ASPRATIO	Nominal_aspect_ratio	-	0.40
RIMDIAME	Nominal_rim_diameter	inch	20
RIMPROF	Rim_profile	-	J
RIMWIDTH	Nominal_rim_width	inch	9.5
RIMOFFSET	Rim_Offset_on_Testrig	mm	-49.0
MANUFACT	Tyre_brand_name	-	Tire_company_name
IDENTITY	Commercial_name	-	Tire_name
PARTNUM	Part_number	-	3x 4 Character Block
SPEEDIND	Speed_index	-	Y
LASTIND	Load_index	-	LI Value
XLIND	ExtraLoad_index	-	XL
TYREMASS	Tyre_mass	kg	12.31
TYROTIN	tyre_rot_inertia_about_YC	kgm2	1.5590
INFLPRES	Inflation_Pressure	bar	2.70
INCLANGL	Inclination_angle	deg	0
MEASDATE	measurement_date	-	TT.MM.JJ. HH:MM
LOAD	vertical_load	N	5200
VERT_STI	linear_vertical_stiffness	N/mm	313.00
AMBITEMP	Ambient_Temperature	deg_C	23.50
TRCKSURF	Surface_of_track	-	Steel blank
SIMTYPE	Kind_of_Simulation	-	Cleat/Braking/Steering/Vertstiff/Longstiff/Latstiff
DRUMRAD	Drum_radius	mm	1250.0
CL_HEIGHT	Cleat_height	mm	20.0

CL LENGHT	Cleat_length	mm	20.0
CLEATANG	Cleat_Angle	deg	0.0
CHAMFORX	Chaphor_X_Length	mm	2.0
CHAMFORY	Chaphor_Y_Length	mm	2.0
TRAJVELC	Trajectory_velocity	Km/h	20.0
RESXID1	Result_x_ID_1	-	I (column in MEASURCHANNELS block)
RESXID2	Result_x_ID_2	-	I (column in MEASURCHANNELS block) (Optional)
The following ..ID1 to ID3 stand for the outputs typical for each simulation, e.g. for Cleat Time, Fx,Fy,Fz. or Vertstiff: TYREDEFW, FZ etc.			
RESYID1	Result_y_ID_1	-	I (column in MEASURCHANNELS block)
RESYID2	Result_y_ID_2	-	I (column in MEASURCHANNELS block)
RESYID3	Result_y_ID_3	-	I (column in MEASURCHANNELS block)
RESYID4	Result_y_ID_4	-	I (column in MEASURCHANNELS block)
RESYID5	Result_y_ID_5	-	I (column in MEASURCHANNELS block)
RESXTIME	Result_x_IDforTime	s	I (column in MEASURCHANNELS block)
RESYFX	Result_y_IDforFxForce	N	I (column in MEASURCHANNELS block)
RESYFY	Result_y_IDforFyForce	N	I (column in MEASURCHANNELS block)
RESYFZ	Result_y_IDforFzForce	N	I (column in MEASURCHANNELS block)
RESMX	Result_x_ID_MX	-	I (column in MEASURCHANNELS block)
RESMY	Result_x_ID_MY	-	I (column in MEASURCHANNELS block)
RESMZ	Result_x_ID_MZ	-	I (column in MEASURCHANNELS block)
RESSA	Result_x_ID_SideSlipAngle	-	I (column in MEASURCHANNELS block)
RESLS	Result_x_ID_LongitudinalSlip	-	I (column in MEASURCHANNELS block)
RESXDEFL	Result_x_ID_Deflec	-	I (column in MEASURCHANNELS block)
RESYDST	Result_y_ID_DSTWGRWH C	mm	I (column in MEASURCHANNELS block)
RESYTRVW	Result_y_IDforTRAJWELW	km/h	I (column in MEASURCHANNELS block)
XOFFSET	Time_offset	sec	0.0

The following keywords are entered in the MEASURCHANNELS area. However, further channels can be added, which are available within the scope of the measurement. The axis system to be used must be specified (without code letter = global axis system (inertial system), H horizontal axis system, C centered axis system with camber etc., FXi, FYi, FZi) A sketch of the axis system used must be enclosed with the documentation.

Runtime is required in each measurement file.					
RUNTIME	Running_Time	s	1	0	0
Cleat: SIMTYPE : cleat					
FXi	Longitudinal_force	N	1	0	0
FYi	Lateral_Force	N	1	0	0
FZi	Vertical_Force	N	1	0	0 or stat. FZ Offset
ROTACCY	Wheelrotationalacceleration	Deg/sec2	1	0	0
Longstiff SIMTYPE : Longstiff					
RIM_X	C11_Rim_X_Position	mm	1	0	0
FXi	Longitudinal_force	N	1	0	0
FZH	Vertical_Force	N	1	0	0 or stat. FZ Offset
Latstiff SIMTYPE : Latstiff					
RIM_Y	C12_Rim_Y_Position	mm	1	0	0
FY	Lateral_Force	N	1	0	0
FZH	Vertical_Force	N	1	0	0 or stat. FZ Offset
Torsional Stiffness / Parking SIMTYPE : torsional, parking					
PHI3	C22_Rim_Angle_Z	deg	1	0	0
FY	Lateral_Force	N	1	0	0
MZ	Z_Moment	Nmm	1	0	0
FZH	Vertical_Force	N	1	0	0 or stat. FZ Offset
Vertstiff (DSTGRWHC optional) SIMTYPE : Vertstiff					
DZ	C30_Ground_Displacement_z	mm	1	0	0
DSTGRWHC	DistanceToGROUNDWHC	mm	1	0	0
FZH	Vertical_Force	N	1	0	0 or stat. FZ Offset
Steering SIMTYPE : steering					
DELTA	Side_Slip_angle	deg	1	0	0
FY	Lateral_Force	N	1	0	0
FZH	Vertical_Force	N	1	0	0 or stat. FZ Offset
MZ	Z_Moment	Nmm	1	0	0

Break/Traction SIMTYPE : braking					
LS	Longitudinal_slip	%	1	0	0
FX	Longitudinal_force	N	1	0	0
FZH	Vertical_Force	N	1	0	0 or stat. FZ Offset

Example TDX-Cleat

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**HEADER
RELEASE                               1.3
MEASID                                 001
SUPPLIER                               Tire_company_name
DATE                                   21-Mar-201x
CLICKTIME                              19:06
PROCTYPE Test procedure type           Cleatmeasurement (cleat)
CUSTOMER                               Name / Department / Contactname

**COMMENTS
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Tire_company_name Tire_name 2xx/5x R 2x 10xY Inflationpressure DOT0xxx
Cleat test on 10x20 TRANSV cleat at 3, 5199N, 0° camber, 2.5 bar
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**PLOTHEADER
Tire_company_name_Tire_name_2xx/5x_R2x_10x_Y_DOT0xxx x.xbar

**PLOTTITLE
CLEAT_4773N_2k7bar_20x20mm_45deg_kmh

**CONSTANTS
FILE original_measurementfile - 539624.xls
NOMWIDTH nominal_section_width_of_tire mm 25x
ASPRATIO nominal_aspect_ratio % 5x
RIMDIAME nominal_rim_diameter inch 2x
RIMPROF Rim_profile - J
RIMWIDTH Nominal_rim_width inch 11.0
RIMOFFSET Rim Offset on Testrig mm -31.0
MANUFACT brand_name - Tire_company_name
MEASDATE measurement_date - 21.03.201x_00:00:00
IDENTITY commercial_name - Tire_name
PARTNUM Part_number K5VT JB1R 2022
SPEEDIND Speed_index Y
LASTIND Load_index 108
XLIND ExtraLoad_index - XL
TYREMASS Tyre_mass kg 15.65
TYROTIN tyre_rot_inertia_about_YC kgm2 2.0197
INFLPRES Inflation_Pressure bar 2.70
INCLANGL Inclination_angle deg 0
LOAD vertical_load N 4773
VERT_STI linear_vertical_stiffness N/mm 393.00
AMBITEMP Ambient_Temperature deg C 23.50
TRCKSURF Surface_of_track Steel blank
SIMTYPE Kind_of_Simulation - Cleat
DRUMRAD Drum_radius mm 1000
CL_HEIGHT Cleat_height mm 20.2500
CL LENGHT Cleat_length mm 20.2500
CLEAT_ANG Cleat_angle deg -45.00
CHAMFORX Chaphor_X_Length mm 2.0000
CHAMFORY Chaphor_Y_Length mm 2.0000
TRAJVELC Trajectory_velocity km/h 60
RESXID Result_x_ID - 1 for braking -> ID to LS
for steering -> ID to DELTA
for parking/torsional -> ID to PHI3
for Longstiff -> ID to RIM_X
for Latstiff -> ID to RIM_Y
for Vertstiff -> ID to DZ
    
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RESYID1	Result_y_ID_1	-	2	for Cleat	-> ID to TIME
				for braking	-> ID to FX
				for steering	-> ID to FY
				for parking/torsional	-> ID to MZ
				for Longstiff	-> ID to FX
				for Latstiff	-> ID to FY
				for Vertstiff	-> ID to FZ
				for Cleat	-> ID to FX
RESYID2	Result_y_ID_2	-	3	for steering	-> ID to MZ
				for Longstiff	-> ID to FZ
				for Latstiff	-> ID to FZ
				for braking	-> ID to FZ
				for Cleat	-> ID to FY
RESYID3	Result_y_ID_3	-	4	for steering	-> ID to FZ
				for Cleat	-> ID to FZ
RESYID4	Result_y_ID_4	-	5		
RESYID5	Result_y_ID_5	-	6		
RESXTIME	Result_x_IDforTime	s	1	for every type	-> ID to TIME
RESYFX	Result_y_IDforFxForce	N	2	for braking	-> ID to FX
				for Longstiff	-> ID to FX
				for Cleat	-> ID to FX
RESYFY	Result_y_IDforFyForce	N	3	for steering	-> ID to FY
				for Latstiff	-> ID to FY
				for Cleat	-> ID to FY
RESYFZ	Result_y_IDforFzForce	N	4	for parking/torsional	-> ID to FZ
				for braking/steering	-> ID to FZ
				for Longstiff	-> ID to FZ
				for Latstiff	-> ID to FZ
				for Vertstiff	-> ID to FZ
				for Cleat	-> ID to FZ
RESMX	Result_x_ID_MX	Nmm	5		
RESMY	Result_x_ID_MY	Nmm	6		
RESMZ	Result_x_ID_MZ	Nmm	3	for steering	-> ID to MZ
				for parking/torsional	-> ID to MZ
RESYDST	Result_y_ID_DSTWGRWHC	mm	5		
RESYTRVW	Result_y_IDforTRAJWELW	km/h	6		
RESLS	Result_x_ID_LongitudinalSlip	%	1	for braking	-> ID to LS
RESSA	Result_x_ID_SideSlipAngle	deg	1	for steering	-> ID to DELTA
				for parking/torsional	-> ID to PHI3
RESXDEFL	Result_x_ID_Deflec	mm	11	for Longstiff	-> ID to RIM_X
				for Latstiff	-> ID to RIM_Y
				for Vertstiff	-> ID to DZ
XOFFSET	Time_Offset	sec	0		
**MODELPARAMETERS					
MR	Rim_Mass	kg	17.93		
IR	Rim_Inertia	kgm2	0.8983		
IRH	Rim_and_Rotating_Hub_Inertia	kgm2	1.0660		
**MEASURCHANNELS					
RUNTIME	Running_Time	s	1	0	0
FX	Longitudinal_force	N	-1	0	0
FZH	Vertical_Force	N	1	0	5200
**MEASURDATA					
0.00134265276839006	18.5340588235294	13.5048823529412			
0.00268530553678012	16.4880588235294	17.1178823529412			
0.00402795830517017	-11.5509411764706	-16.0331176470588			
0.00537061107356023	-17.2449411764706	-20.5301176470588			
0.00671326384195029	-5.17194117647059	2.75788235294115			
..					
**END					