

# MATERIALS



- The materials utilised throughout the ULSAS Programme have been divided into 3 categories.
  - Sheet materials for pressings and blanked and folded parts
  - Tube materials for use in Hydroforming and as formed tubes.
  - Bar and Forging material.

PARTS LIST	B Class		C Class		D Class		E Class		P Class	
	Gauge mm	Grade MPa	Gauge mm	Grade MPa	Gauge mm	Grade MPa	Gauge mm	Grade MPa	Gauge mm	Grade MPa
DESCRIPTION										
SPRING PLATFORM RH, TWISTBEAM	3.4	500	3.8	500	4	500	3.7	500	3.2	500
SPRING PLATFORM LH, TWISTBEAM	3.4	500	3.8	500	4	500	3.7	500	3.2	500
DAMPER BRACKET, TWISTBEAM	3.2	500	3.2	500	3.2	500	3.2	500	3	500
KNUCKLE PRESSING, STRUT & LINKS	3.5	500			4	500			4	500
KNUCKLE PRESSING, STRUT & LINKS					4	500			4	500
LOWER BRACKET, STRUT & LINKS					4	250			4	250
SHEAR PLATE, DOUBLE WISHBONE					2	500			2	500
TRAILING ARM RH, DOUBLE WISHBONE					3	500			3	500
TRAILING ARM LH, DOUBLE WISHBONE					3	500			3	500
SUBFRAME UPPER PRESSING, MULTI-LINK					1.5	250	1.5	250	1.5	250
SUBFRAME LOWER PRESSING, MULTI-LINK					1.5	300	1.5	300	1.5	300
SUBFRAME LOWER PRESSING, MULTI-LINK					1.5	300	1.5	300	1.5	300
INTERMEDIATE PRESSING, MULTI-LINK					1.5	400	1.5	400	1.5	400
FRONT CLOSING PRESSING, MULTI-LINK					2	550	2	550	2	550
BRACKET, LWR ARM, STIFFENER Fr, MULTI-LINK					2	450	2	450	2	450
BRACKET, LWR ARM, STIFFENER Rr, MULTI-LINK					2	250	2	250	2	250
BRACKET, LWR ARM, PLATE Fr, MULTI-LINK					1.2	200	1.2	200	1.2	200
BRACKET, LWR ARM, PLATE Rr, MULTI-LINK					1.2	300	1.2	300	1.2	300
BRACKET, UPR ARM, REAR, MULTI-LINK					1.5	400	1.5	400	1.5	400
BRACKET, UPR ARM, FRONT, MULTI-LINK					1.5	250	1.5	250	1.5	250
REAR CLOSING PRESSING, MULTI-LINK					2	200	2	200	2	200
CONTROL ARM HALF PRESSING, MULTI-LINK					2	300	2	300	2	300
BRACKET, CLEVIS, MULTI-LINK					4	300	4	300	4	300
TRAILING ARM OUTER, LOTUS UNIQUE									1.2 - 2.7	200-400
TRAILING ARM INNER, LOTUS UNIQUE									1.2 - 2.3	150-500
INTERNAL GUSSET BOTTOM, LOTUS UNIQUE									1.7	300
INTERNAL GUSSET TOP, LOTUS UNIQUE									1.7	300
OUTER HUB REINFORCEMENT, LOTUS UNIQUE									2.5	400
LOWER LINK MOUNTING BRACKETS, LOTUS UNIQUE									2.5	400

## SHEET MATERIALS



- A wide range of sheet material parts have been identified across a range of gauges and grades.

Gauge (mm)	Grade (MPa)
1.2	200-300
1.5	250-400
1.7	300
1.8	400
2.0	200-550
2.3	150-500
2.5	400
2.7	200
3.0	500
3.2	500
3.4	500
4	250-500

- This highlights an opportunity for high strength steels in 1 to 4 mm thickness with yield strengths in the range of 200 to 550 MPa.

# TUBE MATERIALS



PARTS LIST	B Class		C Class		D Class		E Class		P Class	
	MATERIAL		MATERIAL		MATERIAL		MATERIAL		MATERIAL	
DESCRIPTION	Gauge mm	Grade MPa	Gauge mm	Grade MPa	Gauge mm	Grade MPa	Gauge mm	Grade MPa	Gauge mm	Grade MPa
TRAILING ARM, TWISTBEAM	2	400	2	400	2	400	2	400	2	400
TRANSVERSE BEAM, TWISTBEAM	3.1	600	3.6	600	4	600	4.1	600	2.8	600
LONGITUDINAL LINK, STRUT & LINKS	Ø 20 x 2	250			Ø 20 x 2	250			Ø 20 x 2	250
BUSH HOUSING, STRUT & LINKS		250				250				250
BUSH HOUSING, STRUT & LINKS		250				250				250
FORWARD LATERAL LINK, STRUT & LINKS	Ø 20 x 2	250			Ø 20 x 2	250			Ø 20 x 2	250
LATERAL LINK BUSH HOUSING, STRUT & LINKS		250				250				250
REAR LATERAL LINK, STRUT & LINKS	Ø 20 x 2	250			Ø 20 x 2	250			Ø 20 x 2	250
LATERAL LINK BUSH HOUSING, STRUT & LINKS		250				250				250
TRAILING ARM BUSH REAR, DOUBLE WISHBONE					3	500			3	500
TRAILING ARM BUSH FRONT, DOUBLE WISHBONE					3	500			3	500
LINK BUSH HOUSING, DOUBLE WISHBONE					3	250			3	250
SHORT LINK, DOUBLE WISHBONE					Ø 14 x 1.5	250			Ø 14 x 1.5	250
LONG LINK, DOUBLE WISHBONE					Ø 25 x 3	250			Ø 25 x 3	250
LINK, DOUBLE WISHBONE					Ø 13 x 1.5	250			Ø 13 x 1.5	250
BUSH HOUSING UPPER LINK , DOUBLE WISHBONE					1.5	250			1.5	250
SLEEVE, PIVOT BUSH, MULTI-LINK					Ø 30 x 1.0	300	Ø 30 x 1.0	300	Ø 30 x 1.0	300
SLEEVE, OUTER BALLJOINT, MULTI-LINK					Ø 40 x 1.5	300	Ø 40 x 1.5	300	Ø 40 x 1.5	300
LINK, MULTI-LINK					Ø 16 x 1.5	250	Ø 16 x 1.5	250	Ø 16 x 1.5	250
HOUSING, BUSH, INBOARD, MULTI-LINK					Ø 34 x 1.0	250	Ø 34 x 1.0	250	Ø 34 x 1.0	250
LINK, MULTI-LINK					Ø 17.5 x 1.5	250	Ø 17.5 x 1.5	250	Ø 17.5 x 1.5	250
INBOARD BUSH HOUSING, MULTI-LINK					Ø 36 x 1.0	250	Ø 36 x 1.0	250	Ø 36 x 1.0	250
LINK, MULTI-LINK					Ø 13.1 x 1.5	250	Ø 13.1 x 1.5	250	Ø 13.1 x 1.5	250
PIVOT BUSH HOUSING, LOTUS UNIQUE									3	300
CRUSH TUBE, CALIPER MOUNTING, LOTUS UNIQUE									3	150
HUB BEARING UNIT HOUSING, LOTUS UNIQUE									3	300
BUSH HOUSING, LATERAL LINK, LOTUS UNIQUE										250
LINK, LATERAL LOWER, LOTUS UNIQUE									Ø 25 x 1.5	250
LINK, LATERAL UPPER, LOTUS UNIQUE									Ø 25 x 1,5	251

## TUBE MATERIALS

- A wide range of Tubular material parts have been identified across a range of diameters, gauges and grades.
- This highlights an opportunity for high strength steel tubes in diameters between 13 and 70 mm with gauges of 1 to 3.5 mm thickness and yield strengths in the range of 150 to 600 MPa.

# BAR & FORGING MATERIALS



PARTS LIST	B Class		C Class		D Class		E Class		P Class	
	MATERIAL		MATERIAL		MATERIAL		MATERIAL		MATERIAL	
DESCRIPTION	Gauge mm	Grade MPa	Gauge mm	Grade MPa	Gauge mm	Grade MPa	Gauge mm	Grade MPa	Gauge mm	Grade MPa
SPRING, TWISTBEAM	Ø 10.04	1300	Ø 10.81	1300	Ø 11.34	1300	Ø 11	1300	Ø 9.52	1300
HUB MOUNTING PLATE, TWISTBEAM	na	600	na	600	na	600	na	600	na	600
KNUCKLE FORGING RH, STRUT & LINKS	na	500			na	500			na	500
KNUCKLE FORGING LH, STRUT & LINKS	na	500			na	500			na	500
SPRING, STRUT & LINKS	Ø 11.44	1300			Ø 12.30	1300			Ø 12.30	1300
KNUCKLE ASSEMBLY RH, DOUBLE WISHBONE					na	600			na	600
KNUCKLE ASSEMBLY LH, DOUBLE WISHBONE					na	600			na	600
KNUCKLE, RH, MULTI-LINK					na	750	na	750	na	750
KNUCKLE, LH, MULTI-LINK					na	750	na	750	na	750
SPRING, MULTI-LINK					Ø 10.78	1300	Ø 10.42	1300	Ø 9.00	1300
SPRING, LOTUS UNIQUE									Ø 8.65	1300
SPRING, DOUBLE WISHBONE					Ø 10.91	1300			Ø 9.08	1300

- A number of forging parts have been identified across a range of material grades.
- This highlights an opportunity for Ultra high strength steel bar in diameters between 8.5 and 12.5 mm with yield strength in the range of 1300 MPa.

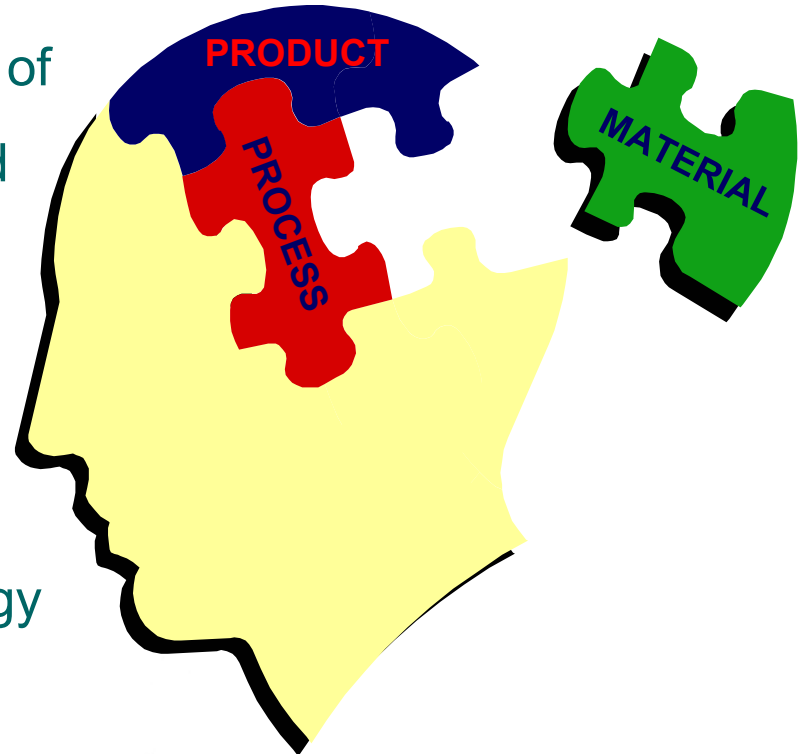


# HOLISTIC APPROACH



The successful application of modern steel materials and technology requires the integration of

- vehicle product technology
- process technology
- material technology



# STEEL PROPERTIES



## Innovative cold rolled products

