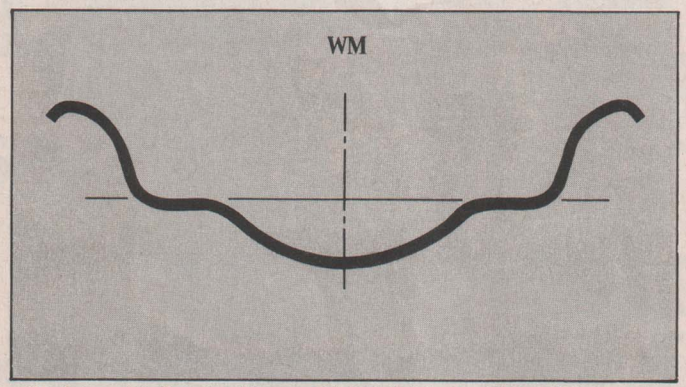
MAD CONFUSION!

A few isolated cases of tyres slipping on wheel rims and allegedly causing accidents has highlighted the wide variety of different rim standards that exists. *J F Drokosch* of the German magazine *PS die Motorrad* untangled the mess and our *Roger Atyeo* added his own few pence worth.

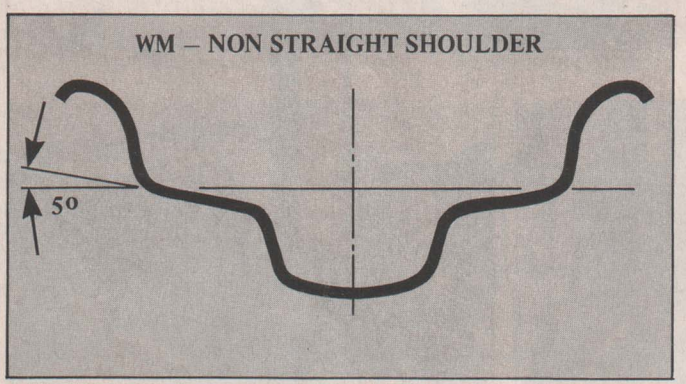
The national press love their shock-horror stories and their motorcycling versions are no exception. So it didn't surprise us when we read of a number of accidents caused by suddenly deflating tyres supposedly throwing the manufacturers into array. Tyremakers were accusing the bike makers of not using wheel rims to the right standards and vice versa.

Fact was that despite there being top-level enquiries going on in Europe and Japan, or so we were told, the accidents, involving tyres slipping on rims and pulling out the tube valves, were very few in number, confined to a single type of tyre and in any case the motorcycle manufacturers involved had received only piecemeal information on the problems. Inevitably the whole affair fizzled out.

It did however highlight an area of confusion that exists. And unless something is done about it soon motorcycle owners could start running into trouble over whether particular tyres can be fitted to their bike's wheels. Already, tyre manufacturers publish complex fitting instructions which are even more important with the introduction of special tubeless tyres and rims which are not compatible with tuned rims. So it may all get out of hand.



WM: Rim with flat shoulders in 1.10 to 3.5 inch width. Still the most popular rim for all light and medium size bikes with tubed tyres.

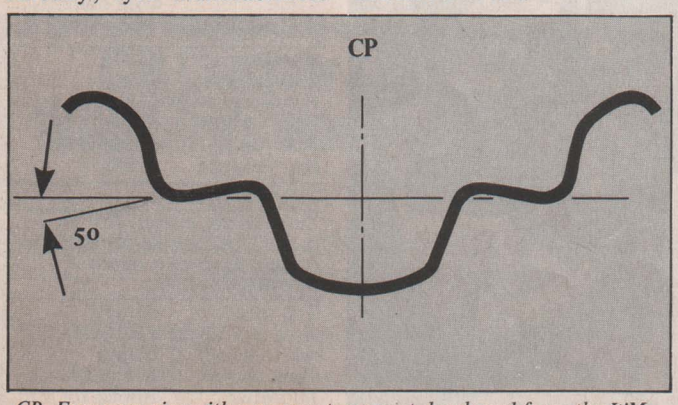


TAPERED WM: Japanese version of the WM with five-degree taper on bead seat. So far used only on Honda Gold Wing with 4.50 x 17 tyre and 2.50 x 17 rim.

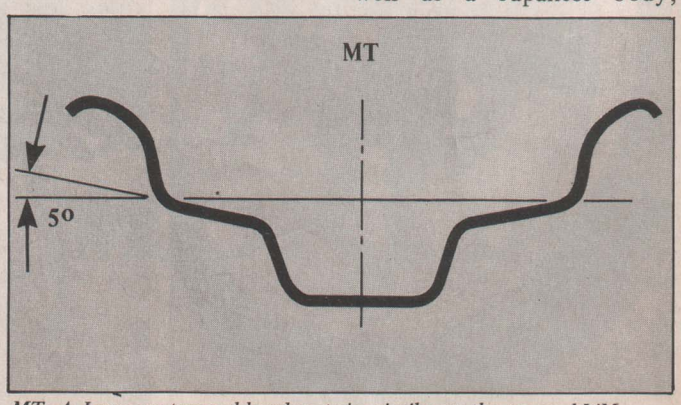
For although just one profile standard exists for car wheel rims, there are no less than eight different rim profiles applicable to motorcycles. Invariably the important rim diameters differ; all differ in the shapes of the rim. And furthermore each profile applies to a variety of widths and wheel diameter.

As you might imagine the dimensions of these profiles run to tight tolerances and provided the tyre manufacturer makes tyres that conform to these dimensions there's no problem. But many are attempting to make tyres which will fit as many of the different rims as possible – if not all – and here the trouble starts.

Should you feel that a single standards organisation should exist to monitor rim and tyre standards then you feel the same way as us. At the moment there is an American standard, A European standard run by the European Tyre and Rim Technical Organisation as well as a Japanese body,



CP: European rim with a reverse taper seat developed from the WM series in 1.85 to 3.5 inch widths and only used on BMW Moto Guzzi and Laverdas.



MT: A Japanese tapered bead seat rim similar to the tapered WM with five-degree bead seat in 1.85 to 3,5 inch widths. Only used on Japanese bikes.

JATMA. Our own British Standards Institution only lists one of the eight types of rim in its AU50 specifications.

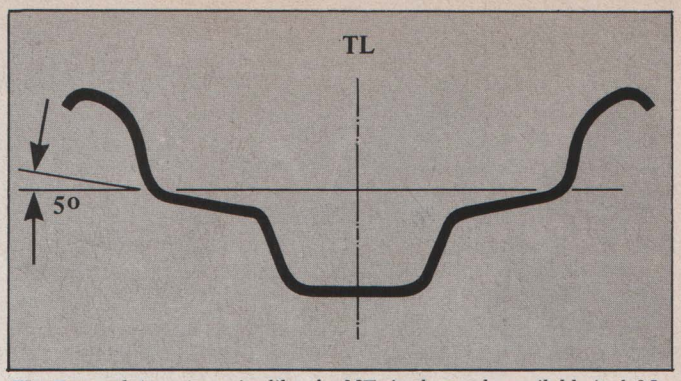
For your information we have provided sketches (given by Metzeler) showing the obvious differences between the rim profiles. The WM (the original rim type) has straight shoulders (fig 1). Then there is the WM with non-straight shoulders (fig 2), MT with tapered seats for tubeless tyres (fig 4), MT-H2 with tapered seats and humps to prevent bead movement, (fig 5), the American TL (fig 6) and the TL with humps. The CP (fig 3) has what are called negative conic shoulders.

The most significant difference between the rims (of the same nominal diameter) is that the radii differ. It's only a matter of a millimeter at the most but this is very important to tyre fitting. Some measure of the difficulty that can arise is that for example, Michelin tyres are neither manufactured nor recommended for tubeless rims. Nor should they be fitted to a rim with a tapered bead seat. This may appear to be straightforward but if a person wants to fit a Michelin tyre to his CX500 Honda (tubeless rims) there is nothing to stop him. There's nothing to tell him not to fit the tyre on the rim either. He thinks that because the rim and tyre diameters are the same it's correct. But it's not.

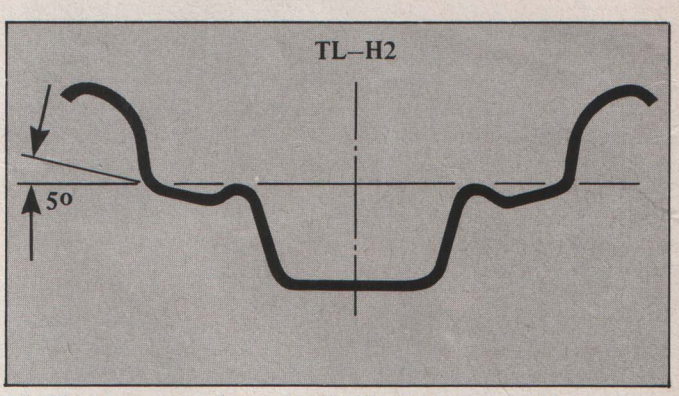
Tyre design by many of the factories now has to take into account the differences in all the rims to avoid damage or accidents by constructing tyres suitable for a variety of rims. Metzeler, for example, make their tyres for the common varieties of rim. These are as follows:

WM: Rim with flat shoulders in 1.10 to 3.5 inch width. Still the most popular rim for all light and medium size bikes with tubed tyres.

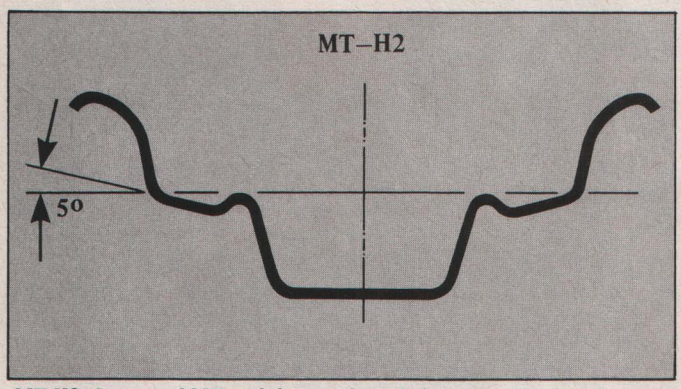
TAPERED WM: Japanese



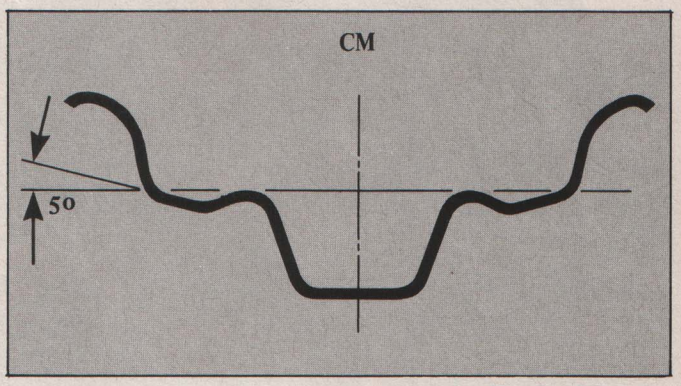
TL: Tapered American rim like the MT rim but only available in 1.85 and 2.15 inch width.



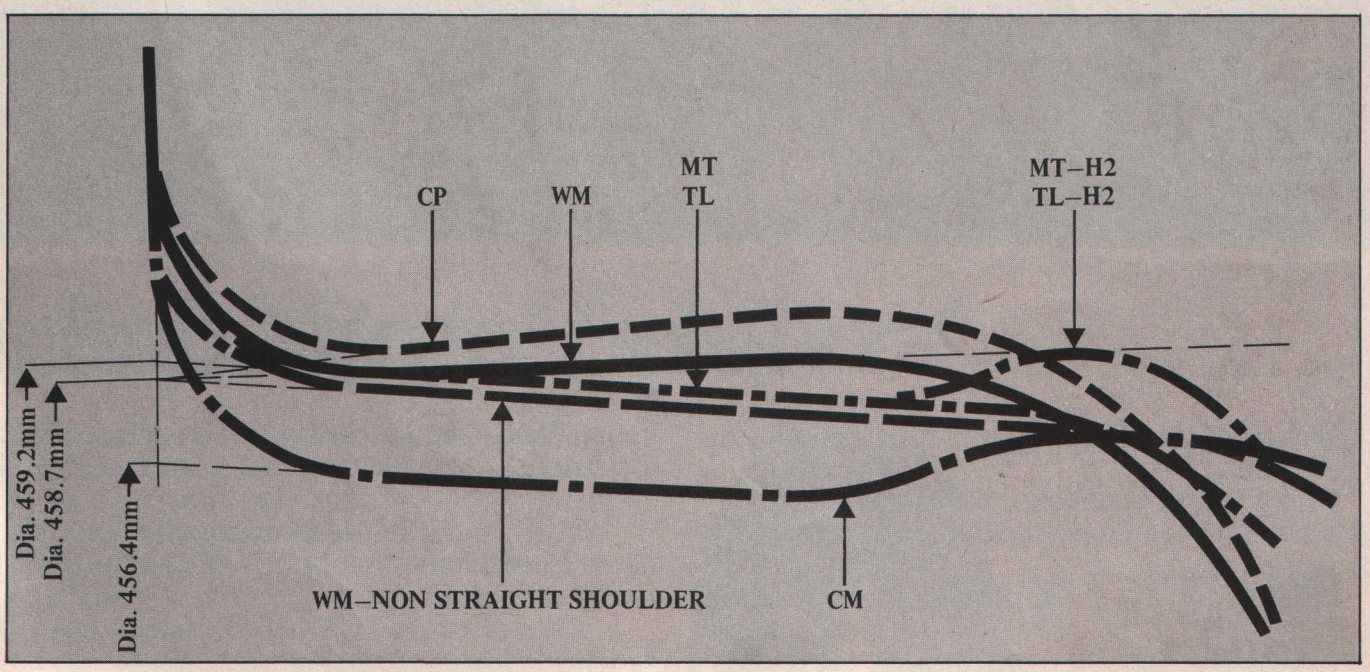
TL-H2: American similar to the MT-H2 but bead seat width is constant with rim width so that the well widens as the rim widens.



MT-H2: Improved MT with humps for tubeless tyres. Used on heavy Japanese bikes such as the CBX Honda in 2.15 to 3.5 inch width.



CM: American tapered seat rim with humps only offered in 2.5 inch width. Only used on Harleys.



Drawn above is a comparison of the various rim profiles. Not only do they vary in shoulder contour but also in radii.

version of the WM with five-degree taper on bead seat. So far used only on Honda Gold Wing with 4.50 x 17 tyre and 2.50 x 17 rim.

CP: European rim with reverse taper seat developed from the WM series in 1.85 to 3.5 inch widths and only used on BMW Moto Guzzi and Laverdas.

MT: A Japanese tapered bead seat rim similar to the tapered WM with five-degree bead seat in 1.85 to 3.5 inch widths. Only used on Japanese bikes.

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If that lot's enough to get you confused prepare yourself for the tyre recommendation tables that the manufacturers offer. These show the best rim size for a particular tyre diameter plus a selection of addition sizes either side of the preferred width.

For example, Continental tyres give the 1.85 x 18 in. rim size for their 3.00 x 18 in. tyre. But the 1.50, 1.60 and 2.15 widths are also applicable, though the tread profile deffers slightly. This occurs for every tyre.

Once you've selected the correct tyre to fit your bike's rims there are several points to remember to get the best life from the tyre. The pressure is the most important. But keeping a close check on the condition of the tread and side walls is useful.

The correct pressure for the tyre depends on the load it carries. If underinflated, excessive distortion will occur in the side walls that generates heat. And if too much heat is generated the the fabric will ultimately be destroyed.

Increases in speed also develop higher stresses and temperatures in the tyre which higher pressures mitigate. For these reasons there is a complex number of factors that dictate pressure.

The tyre manufacturers therefore also publish load and pressure tables to give riders some idea of what to aim for.

Tubeless tyres have their own requirements. They should be fitted by somebody who knows their peculiarities and is skilled enough to mount the tyre without damaging the rim or the tyre bead. A tight fitting is absolutely essential before the tyre is inflated. Tubless tyres use rims with larger valve openings and if tubed tyres are fitted special sleeves have to be fitted over the valves to prevent it parting company with the tube.

There are so many imponderables that it is difficult to point an accusing finger at those responsible for such confusion. It would appear that as the need has arisen new rim profiles have been designed to cater for the particularly demanding requirements made by the heavier superbikes. It has also been made easier by the introduction of one-piece cast wheels which are easy to machine at the factories. Previously rolled steel rims required heavy expenditure in tooling which is difficult to change.

Without a new and common standard for tubed and tubeless rims we are sure that in future there will be further incidents which will be attributed to the variety of different standards of wheel rims. It should be introduced as soon as possible if only to ease the lot for the man in the street.

TYRES FOR MOTORCYCLES ACCORDING TO DIN 7802

Tyre Size	Tread pattern	Permissible rim	Inner tube straight valve 34 G	Rim tape	Tyre dimensions: Section width	Operating width max	Outside diameter ±1%	Static radius ±1.5%	Rolling circumference ±2%	Tyre load-bearing capacity (kg) at air pressure (bar): 1,25	1,5	1,75	2,0	2,25	2,5	2,8	Maximum speed km/h
2.50–17	K 112	1,20 x 17 1,35 x 17 **1,50 A x 17** 1,60 x 17	C 17	16–17" /23	69	70 72 73 74	576	274	1735	60	65	75	80	**90**			
2.75–17	RB 2 K 112	1,35 x 17 1,50 A x 17 **1,60 x 17** 1,85 B x 17		16–17" /28	74	76 77 78 82	586	278	1760	75	85	100	115	130	145	**160**	
3.00–17	K 112	1,50 A x 17 1,60 x 17 **1,85 B x 17** 2,15 B x 17	D 17		82	83 84 87 90	598	283	1790	85	100	115	135	150	170	**190**	
2.50–18	RB 2	1,20 x 18 1,35 x 18 **1,50 A x 18** 1,60 x 18	C 18	18–19" /23	69	70 72 73 74	602	283	1780	65	75	90	100	**110**			**150**
2.75–18	RB 2 K 112	1,35 x 18 1,50 A x 18 **1,60 x 18** 1,85 B x 18			74	76 77 78 82	612	291	1840	75	90	105	120	135	150	**170**	
3.00–18	K 112	1,50 x 18 1,60 x 18 **1,85 B x 18** 2,15 B x 18	D 18		82	83 84 87 90	624	296	1870	90	105	125	145	160	180	**200**	
3.25–18	RB 2 K 112	1,50 x 18 1,60 x 18 **1,85 B x 18** 2,15 B x 18	E 18	18–19" /28	88	90 91 93 96	642	301	1905	110	135	155	180	200	220	**240**	
3.50–18	K 112	1,60 x 18 1,85 B x 18 **2,15 B x 18** 2,50 B x 18			95	95 98 101 104	654	307	1940	130	150	175	195	220	240	**260**	
5.00 S 16	K 112	**3,00 D x 16**	G 16	16–17" /28	133	141	664				200	230	260	290	**320**		
2.75 S 18	RB 2	1,35 x 18 1,50 A x 18 **1,60 x 18** 1,85 B x 18	C 18	18–19" /28	76	78 79 80 84	610	291	1850		75	90	105	120	**135**		
3.00 S 18	RB 2 K 112	1,50 A x 18 1,60 x 18 **1,85 B x 18** 2,15 B x 18	D 18		84	85 87 90 93	622	296	1880		90	105	125	145	**160**		
3.25 S 18	RB 2 K 112	1,50 A x 18 1,60 x 18 **1,85 B x 18** 2,15 B x 18	E 18		91	93 94 96 100	640	301	1915		110	135	155	180	**200**		**180**
3.50 S 18	RB 2 K 112	1,60 x 18 1,85 B x 18 **2,15 B x 18** 2,50 B x 18			98	98 101 104 107	652	307	1950		130	150	175	195	**220**		
4.00 S 18	K 112	1,85 B x 18 2,15 B x 18				111 114	672	318	2025		170	195	220	245	270		

LOAD & PRESSURE TABLE

	Everywhere except North America. Partout a l'exception de l'Amerique du Nord. Überalls mit Ausnahme von den Vereinigten Staaten.														North America only. L'Amerique du Nord seulement. Nur die Vereinigten Staaten.					
	Inflation Pressure. Pression de gonflage. Luftdruck.																			
bar≙kg/cm²	1.50		1.75		2.00		2.25		2.50		2.75		3.00							
psi	22		25		29		33		36		40		44		12	16	20	24	28	32
Tyre Size Dim. du pneu Reifengrösse	Tyre load capacity. Capacité aux charges du pneu. Last des Reifeninhalts.																			
	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	lbs	lbs	lbs	lbs	lbs	lbs
2.25S17R					74	**163**	82	**181**	90	**198**	105	**231**	115	**253**	140	170	190	210	230	250
2.50S17R					83	**183**	94	**207**	105	**231**	116	**256**	130	**287**	160	190	220	250	270	290
2.50S18	62	**137**	74	**163**	86	**190**	98	**216**	110	**242**					170	200	230	260	280	310
2.75S18R					104	**229**	120	**265**	135	**298**	151	**333**	170	**375**	210	250	280	310	350	370
2.75S19	75	**165**	91	**201**	107	**236**	124	**273**	140	**309**					220	260	290	320	350	380
3.00S16	75	**165**	91	**201**	107	**236**	124	**273**	140	**309**					220	260	290	330	360	390
3.00S17R					117	**258**	134	**295**	150	**331**	168	**370**	190	**419**	230	270	310	340	380	410
3.00S18R					125	**276**	143	**315**	160	**352**	178	**392**	200	**441**	240	280	320	360	400	430
3.00S19R					133	**293**	152	**335**	170	**375**	188	**414**	210	**463**	250	300	340	380	410	450
3.00S21R					140	**309**	160	**352**	180	**397**	200	**441**	220	**485**	280	330	380	420	460	490
3.25S16	100	**220**	120	**265**	140	**309**	160	**352**	180	**397**					230	270	310	340	370	400
3.25S17	106	**234**	127	**280**	148	**326**	169	**373**	190	**419**					240	280	320	360	390	430
3.25S18	112	**247**	134	**295**	156	**344**	178	**392**	200	**441**					250	300	340	380	410	450
3.25S19	122	**269**	144	**317**	166	**366**	188	**414**	210	**463**					260	310	350	390	430	470
3.50S18	128	**382**	151	**333**	174	**384**	197	**434**	220	**485**					270	320	370	410	450	490
4.50S19	134	**295**	158	**348**	182	**401**	206	**454**	230	**507**					280	340	390	430	470	510

Many tyre manufacturers publish charts showing which rim sizes their tyres should be fitted to. There is one ideal rim size and several preferred sizes. The chart shown is from Continental's booklet, which however is not specific on the rim standards required apart from the differentiation between tubed and tubeless tyres. In addition manufacturers publish load and speed charts for their tyres, such as Avon.