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CONSTRAINING NUMERICAL VALUES FOR A REFERENCED CRICKET BAT HANDLE ON SELECTED GEOMETRICAL PARAMETERS

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Abstract:
A survey was carried out on Grade 'A' cricket bats handles, made up of the finest quality of four pieces Singapore cane with 3 rubber springs. Standard cricket bats handles were chosen from four different cricket manufacturing agencies, due to having different geometrical parameters. All handle were meticulously taken off from the blade and then they were measured and recorded, aiming to constraining a new measurement for a referenced cricket bat handle of short length. The estimation was made on the behalf of the measurement (value) taken from different size of handle ranging from their minimum to maximum, and standard values of handle keeping in view on their distinct parameters separately. So, by this way determination of geometric parameters and new modification were made for constraining measurement for a referenced cricket bat handle (i.e. short in length and round in shape) found for our purpose.

Keywords: Cricket bat, Cricket bat handle, selected geometrical parameters

1. Introduction

The design and structure of sports equipment is an interesting task and has been developing since decades. The selection of handle design and material can have significant effect on the performance. Down the years and behind the scenes, experiments had been carried out on the use of different type of design and material

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used into handle (Katiyar, Murtaza, & Ali, 2016). Grant, (1998) suggested that the handle offers the most scope for improvements in bat performance. However, improvements to the handle remain relatively unexplored (John & Li, 2002).

Some work has been performed in the area of predicting bat performance, but little has been done in the way of quantifying their durability or longevity. As a consequence of material restriction, most cricket bat developments are geometry related. An accurate model could aid developers in predicting the effect of changes to the design of a bat.(Allen, Fauteux-Brault, James, & Curtis, 2014)

But now a days handles were available with recent technological innovations and advancement, that the handle is constructed of such materials to add some reinforcement, used fairly to provide more power in the hitting zone and available in the market with different structural make-up i.e. long and short in size and round and oval in shape (Laver, 2002). And in addition to this S. Ali, & S. T. Murtaza invented a cricket bat with detachable handle (993/DEL/2014 A, 2014).

An optimised study was carried out on the different shapes of cricket bat handles available in the market, taking design (i.e. size and shape) as a variable. This work provided an overview, measures and to record the prevalence of many type of design and structure of handle from minimum to maximum range used in different types of cricket bat, from the manufactures of different agencies in order to predicting a different value of the handle for our purpose aiming to constraining numerical values on selected geometrical parameters for a referenced cricket bat handle of short length (Katiyar, Murtaza, & Ali, 2018). The structure of handle made to be constraint with the objective to overcome the problem of using 10% non-wood material (i.e. Joint Assembly and their parts) within the limit of MCC's Law 5 (the bat) into the handle, for making the handle detachable with their distinct length (i.e. short to long) via joint assembly (Ali, Murtaza, & Katiyar, 2016).

2. Methodology

After reviewing related literature from the secondary sources, that provides critical background information that prepares the researcher for making observations, and conducting interviews and surveys in the field for obtaining ideas & information first hand.

So, an extensive survey had been conducted that includes the collection of primary data and specimen in the form of raw material from the primary sources by directly visiting to the markets and workplaces of cricket bat manufacturing companies from the 'Sports City of India', Meerut, Uttar Pradesh. During surveying a lot of field work done for collection of data, specifically looking for sample with their physical examination & investigation to make comparison in between of them. And the results will verify or refute, inform and help to shape the answer to research question.

The entire sample was selected from Grade 'A' cricket bats handles that was short in size and round in shape and made up of finest quality of Singapore cane with 3

rubber springs. The sample considered for the measurement was selected from the four different cricket manufacturing agencies (i.e. SG, SS, SF, and BDM).

All handles were brilliantly taken off from the blade and then they were measured on the selected geometrical parameters of handle by using a standard scale and venire caliper and all the reading were taken in millimeters (mm). All the values were taken and recorded from different models of cricket bat ranging from their minimum to maximum size of handles, along with the standard values, aiming to set a constraint dimension for a modified referenced handle from the collected samples from each manufacturers, which are more dominating into the market and prevalence in between of players.

All the measurements were recorded on the selected parameter of handle in the measurement sheet that is given in the Table 1.

Table 1: Measured values of Cricket Bat Handles

S.No	Cricket Bat Manufacturing Agency	Main Parameters of Handle	Technical Parameters	Symbol	Range (Min-Max)	Standard Value (mm)
1	SG	**Full Handle**	Total Length of Handle	TLOH	410-430	425
		Handle Outside the Blade	Total Length of Handle Outside the Blade	TLOB	215-260	235
			Length of Top Part	LTP	20-30	25
			Length of Middle Part	LMP	190-220	210
		Handle Inside the Blade	Total Length of Handle Inside the Blade	TLHIB	170-190	185
			Length of Handle Inside Blade from Neck Point	LHIBNP	120-135	130
			Thickness of handle at Neck Point	THNP	20-38	35
			Thickness of handle at Bottom Point	THBP	38-50	45
			Breadth of handle at Neck Point	BHNP	20-30	25
			Breadth of handle at Bottom Point	BHBP	2-8	4
		Handle In Neck Region	Total Length of Handle in Neck Region	TLHN	50-70	60
			Tapered Angle of handle in spine	T_AHS	10-20	3^o, 15
		Handle Diameter	Diameter of Handle's Top Part	DHTP	34-36	35
			Diameter of Handle's Middle Part	DHMP	30-35	32
		Rubber Insertions	Middle Insertion of Rubber	MRI	250-270	270
			Side Insertion of Rubber	SRI	250-270	270
2	SS	**Full Handle**	Total Length of Handle	TLOH	410-425	420
		Handle Outside the Blade	Total Length of Handle Outside the Blade	TLOB	210-260	230
			Length of Top Part	LTP	20-28	25
			Length of Middle Part	LMP	200-225	205
		Handle Inside the Blade	Total Length of Handle Inside the Blade	TLHIB	175-185	185
			Length of Handle Inside Blade from Neck Point	LHIBNP	120-135	125
			Thickness of handle at Neck Point	THNP	20-45	40
			Thickness of handle at Bottom Point	THBP	45-55	50
			Breadth of handle at Neck Point	BHNP	20-30	25
			Breadth of handle at Bottom Point	BHBP	2-5	4
		Handle In Neck Region	Total Length of Handle in Neck Region	TLHN	60-70	65
			Tapered Angle of handle in spine	T_AHS	18-25	5^o, 20
		Handle Diameter	Diameter of Handle's Top Part	DHTP	34-36	35.5
			Diameter of Handle's Middle Part	DHMP	30-35	32.5
		Rubber Insertions	Middle Insertion of Rubber	MRI	250-280	270
			Side Insertion of Rubber	SRI	250-270	260
3	SF	**Full Handle**	Total Length of Handle	TLOH	415-435	430
		Handle Outside the Blade	Total Length of Handle Outside the Blade	TLOB	230-265	250
			Length of Top Part	LTP	25-32	30
			Length of Middle Part	LMP	200-230	210
		Handle Inside the Blade	Total Length of Handle Inside the Blade	TLHIB	170-185	180
			Length of Handle Inside Blade from Neck Point	LHIBNP	120-135	130
			Thickness of handle at Neck Point	THNP	30-40	35
			Thickness of handle at Bottom Point	THBP	45-50	45
			Breadth of handle at Neck Point	BHNP	20-30	25

			Breadth of handle at Bottom Point	BHBP	2-5	2
		Handle In Neck Region	Total Length of Handle in Neck Region	TLHN	40-60	50
			Tapered Angle of handle in spine	T_AHS	10-20	4^o , 15
		Handle Diameter	Diameter of Handle's Top Part	DHTP	34-36	34.5
			Diameter of Handle's Middle Part	DHMP	30-35	31.5
		Rubber Insertions	Middle Insertion of Rubber	MRI	260-280	270
			Side Insertion of Rubber	SRI	280-300	300
4	**BDM**	**Full Handle**	Total Length of Handle	TLOH	415-430	420
		Handle Outside the Blade	Total Length of Handle Outside the Blade	TLOB	220-260	240
			Length of Top Part	LTP	25-30	25
			Length of Middle Part	LMP	200-220	205
		Handle Inside the Blade	Total Length of Handle Inside the Blade	TLHIB	170-190	180
			Length of Handle Inside Blade from Neck Point	LHIBNP	115-125	120
			Thickness of handle at Neck Point	THNP	30-40	35
			Thickness of handle at Bottom Point	THBP	45-50	45
			Breadth of handle at Neck Point	BHNP	20-30	23
			Breadth of handle at Bottom Point	BHBP	2-5	4
		Handle In Neck Region	Total Length of Handle in Neck Region	TLHN	55-65	60
			Tapered Angle of handle in spine	T_AHS	15-25	2^o , 20
		Handle Diameter	Diameter of Handle's Top Part	DHTP	34-36	34.5
			Diameter of Handle's Middle Part	DHMP	30-35	32.5
		Rubber Insertions	Middle Insertion of Rubber	MRI	240-250	245
			Side Insertion of Rubber	SRI	260-290	280

3. Finding of the Work

From the above Table 1 estimation was made on the behalf of measurement (numerical values) taken from different size of handles ranging from minimum to maximum alongwith the standard values of handle used into different models of cricket bat, keeping in view on their distinct parameters separately. So, by this way a new constraint measurement for a modified handle of (Short Length) is found and given below in Table 2;

Table 2: Constraint Measurements of Geometrical Parameters for a Referenced Cricket Bat Handle

S.No.	Main Parameters of Handle	Technical Parameters	Symbol	Predicted Value (mm)
1	**Full Handle**	Total Length of Handle	TLOH	430
2	**Handle Outside the Blade**	Total Length of Handle Outside the Blade	TLOB	235
		Length of Top Part	LTP	30
		Length of Middle Part	LMP	205
3	**Handle Inside the Blade**	Total Length of Handle Inside the Blade	TLHIB	195
		Length of Handle Inside Blade from Neck Point	LHIBNP	130
		Thickness of handle at Neck Point	THNP	35
		Thickness of handle at Bottom Point	THBP	50
		Breadth of handle at Neck Point	BHNP	25
		Breadth of handle at Bottom Point	BHBP	5
4	**Handle In Neck Region**	Total Length of Handle in Neck Region	TLHN	65
		Tapered Angle of handle in spine	T_AHS	3^o, 20
5	**Handle Diameter**	Diameter of Handle's Top Part	DHTP	36.5
		Diameter of Handle's Middle Part	DHMP	32.5
6	**Rubber Insertions**	Middle Insertion of Rubber	MRI	270
		Side Insertion of Rubber	SRI	260

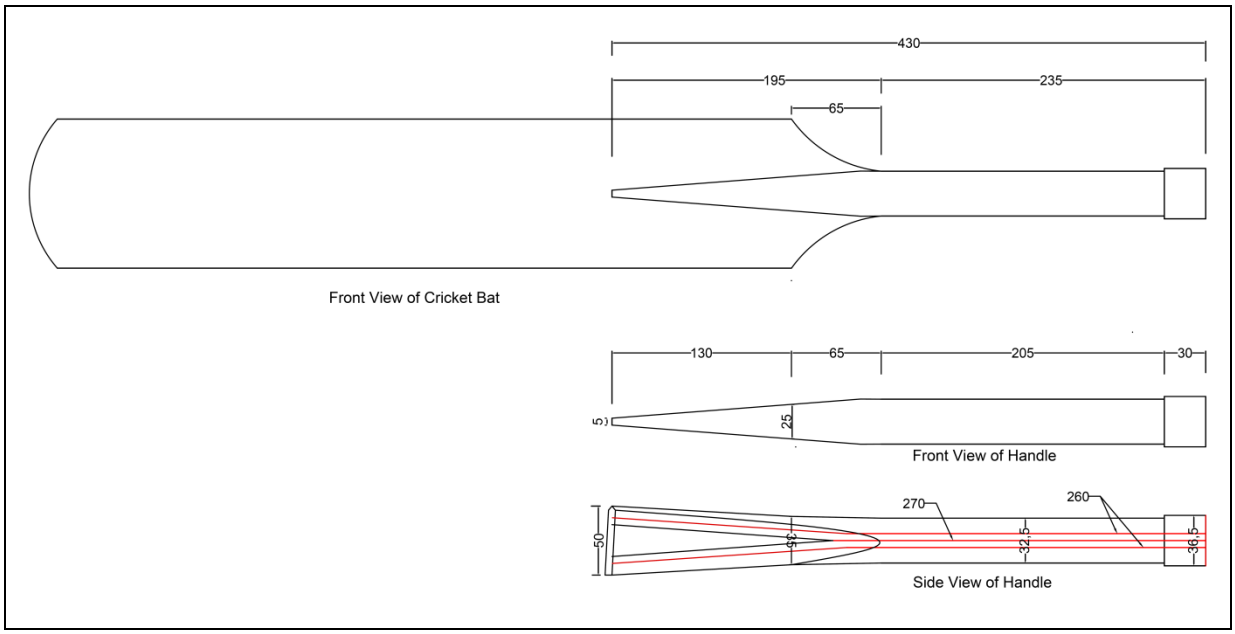

Figure 1: Constraint measurements of a Referenced Cricket Bat Handle

4. Conclusion

A new constraint measurement (value) for a referenced cricket bat handle of short length was found in order to overcome the problem of using 10% non-wood material (i.e. Joint Assembly and their parts) within the limit of Law 5 the-bat pertaining the use of material into the handle (MCC, 2017) for making the detachable handle with their distinct length (i.e. short to long) via joint assembly The aim of conducting such type of work is to gives an overview, measures and to record the prevalence of many type of design and structure of handle from minimum to maximum range used in different types of handle used into different models of cricket bat manufactured by different agencies in order to predicting a different value for a referenced cricket handle of short length for our purpose.

References

1. Ali, S., & Murtaza, S. T. (2014). *993/DEL/2014 A*. India: The Patent Office Journal, India. Retrieved from http://www.ipindia.nic.in/writereaddata/Portal/IPOJournal/1_142_1/official-journal-20-06-2014-part1.pdf
2. Ali, S., Murtaza, S. T., & Katiyar, A. K. (2016). Innovative Cricket Bat-A Way to Reduce player's Burdon. *International Journal of Engineering & Scientific Research*, *4*(1), 189–196.
3. Allen, T., Fauteux-Brault, O., James, D., & Curtis, D. (2014). Finite Element Model of a Cricket Ball Impacting a Bat. *Procedia Engineering*, *72*, 521–526. https://doi.org/10.1016/j.proeng.2014.06.090

4. Grant, C. (1998). The role of materials in the design of an improved cricket bat. *MRS Bulletin*, *23*(3), 50–53. https://doi.org/10.1557/S0883769400029997
5. John, S., & Li, Z. B. (2002). Multi-directional vibration analysis of cricket bats. The engineering of sport, 4, 96-103.
6. Katiyar, A. K., Murtaza, S. T., & Ali, S. (2016). Critical Analysis on the Design and Use of Materials in Cricket Bat Handles. *International Journal of Research in Economics and Social Sciences (IJRESS)*, *6225*(10), 223–228. Retrieved from http://euroasiapub.org/current.php?title=IJRESS
7. Katiyar, A. K., Murtaza, S. T., & Ali, S. (2018). Determining Geometrical Parameters for a Referenced Cricket Bat Handle. *European Journal of Physical Education and Sport Science*, *4*(3), 158–164. https://doi.org/10.5281/zenodo.1218138
8. Laver, J. (2002). Laver & Wood Cricket Bats: The CARBO - 2008 Carbocane Handle Technology. Retrieved 20 February 2018, from http://www.laverwood.co.nz/carboproduct_detail.php
9. MCC. (2017). © Marylebone Cricket Club Laws of Cricket 2017 Code, (April), 1–82.