Concept of Proportional Adjustment in Asset Value based on Ease of Accessibility

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Abstract

Different approaches for asset valuation are often used based on understanding of the case specific requirements. These are based on fundamental principles that govern the rules and parameters that ensure the process, result is fair and valid. Although, some methods, are ambiguous and lack clarity. This paper intends to address ambiguity of one such method where the belting of land is used. The paper also gives logical reasoning and explanation of the concept of ease of accessibility and the proportional adjustment of value. This concept gives the criteria to test if a property is too narrow or too long along with the appropriate reduction applicable in both cases. If the property is too narrow, the reduction is computed directly from ease of accessibility. If the property is too long, the reduction is computed by Auxiliary Belting Method.

Keywords: Property Valuation; Concept of Belting; Auxiliary Method; Ease of Accessibility; Real Estate

Introduction

Valuers of Immovable Assets often implement different approaches for property valuation based on their understanding of the situation on the ground. It is arbitrary and based on the judgement of the expert. Various approaches that are used for valuation are based on some fundamental concept. The concepts govern the rules and parameters that test the conditions of applicability of the chosen approach of valuation. Thus, understanding the fundamental concepts along with the various approaches is paramount to ensure that the chosen approach of valuation is fair and valid. Some of the concepts are ambiguous and are used rarely but application of such concepts becomes imperative when the on-site condition of asset demands its implementation. The Belting Method is an approach of land valuation which is ambiguous as it is based on some assumptions. This article intends to focus on the concept of the Ease of Accessibility, the proportional adjustment in the value of Land, and the Auxiliary Method based on concept of Belting.

Literature Review

Whenever a plot of land is too long or too narrow, Belting Method of Valuation has often been used by Valuers in Cost and Market Approach both but, the method is always avoided by Valuers (Sanjay Oswal, 2024). The origin of this method is traced by the term, 'Hoffman Rule' in 1886, US and has been modified over the years. Also, this was alternatively known as 'the process of halving'. This system has certain criteria and aspects. (Namavati, 1991). The Belting Method lacks explanation for the modifications and in some cases, the method has been altered arbitrarily based on the judgement of expert and cases specific details. There are numerous precedent court judgements in India that deal with the conflicts raised due to lack of the academic literature. This has resulted in more legal involvement in a concept lacking technical clarity (Gandhi, 2017).

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Although, the method is not specifically mentioned in the Standard Valuation Guidelines, it is aligned with the Market Approach of Valuation and is implemented under the flexibility given to the professionals. (IVS-Council, 2022; RICS, 2022) Several judicial matters related to this were studied to conclude that this method is used with ambiguity in the procedure, factors, variables, applicability, and limitations. This article provides explanations and clarifications related to this method with a broader scope.

1. Land with road fronts along one boundary, where sub-division not possible and in the presence of non-availability of comparable. (State Vs. Phanindra Kumar, 1973) (Ananthan Pillai Vs State of Kerala, 1961)

2. Need to have general or uniform rule as to the extent of depth of first belt. (Bombay High Court, 1953) (Mohini Mohan Saha Vs. State of Bengal) This is relevant because the method is applied to the plots independently. Say, two adjacent plots where this method is applicable would have different length for first belt, which is why it is not logically acceptable.

3. Different value of each belt and count of belts was used due to which the conflict was created. It is essential to have evidence of inter se value of different belts. (Premchand Burral Vs. Collector of Callcutta, 1876). There is no proper guideline for the reduction to be applied is available and it is up to the judgement of the valuer to determine the same. This makes it more subjective which is why it is not logically acceptable.

4. Judicial Recognition. The court has stated that, "It is highly artificial system and cannot be resorted to as a hard and fast rule". (Premchand Burral Vs. Collector of Callcutta, 1876) (Nityagopal Sen Poddar and others Vs. Secretary of State, 1933) Although, the concept for which the reduction of value by belting is valid, the method used is different for each case and does not have proper logical reasoning or explanation which makes it ambiguous and often not acceptable.

5. Court was not in favour of Belts because it is ambiguous in many ways. (Hukumhand & others Vs. Haryana State, 1989) There is no development of clarity and standardization in the method, and case-based judgements, are not technically sound due to which, no one wants to use this method.

The objective of the study

Based on the literature, it is evident that several parameters related to the belting method are assumed arbitrarily because it lacks proper explanation of the implementation process. This gap is addressed through this article.

The study is intended to provide clarity on use of the belting method, the concept of ease of accessibility, criteria and parameters that determine if a plot is too long or too narrow. . It also intends to introduce the auxiliary method based on concept of belting and ease of accessibility, understand the correlation, and its implementation.

The addresses the following ambiguities related to Belting Method of Valuation.

- Why the n^{th} Belt Length is exactly 1.5x times the n-1th Belt Length?
- Why only 3 Belts are considered in general?
- Why there is no uniformity in the reduction factor of 2nd and 3rd Belt?
- How to decide the Length (depth) of 1st Belt?
- What are the criteria of application for this method?

Methods

This is a conceptual study based on the analysis of a fundamental principle that not only explains the logic and rationale behind the steps involved in the Belting Method but also gives more insight into the application criteria of this method. The mathematical and analytical evidence is obtained based on the computations to correlate with the theoretical concepts, so the proposed theory gets logical support.

The concept of ease of accessibility is studied and the value of the constant is defined and used as criteria for testing if the property is too narrow or too long. Also, an auxiliary method based on principle of belting as proposed that explains the rationale of its implementation based on the constant of ease of accessibility. These concepts and methods are used for valuation of Land by Market Approach. Further, the proposed concept is used in adjacent properties and implemented in actual valuation assignment given as case studies, and its acceptance and approval from all the concerned parties is also obtained.

Results

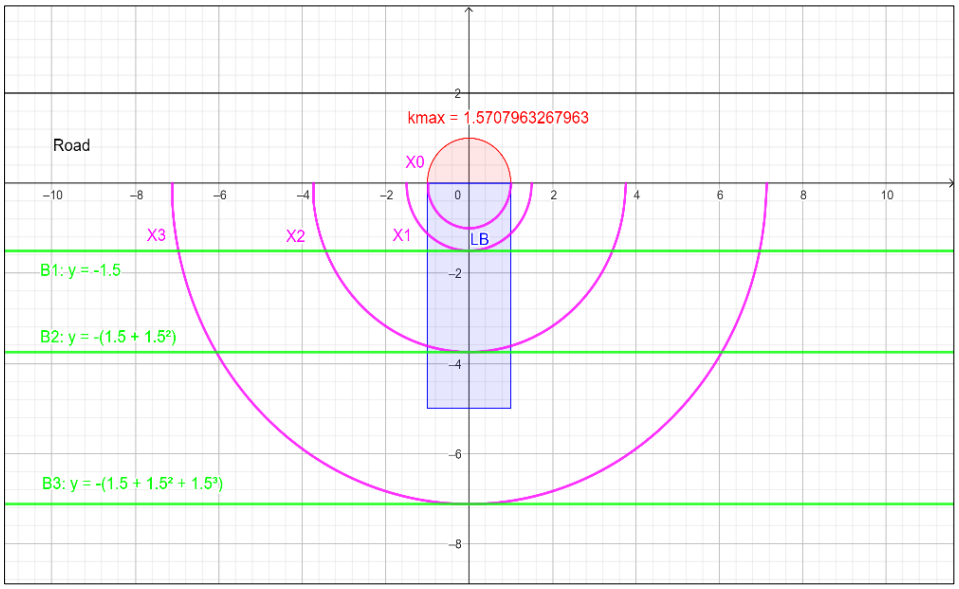
Ease of Accessibility Concept

When a plot of land allows the flow of traffic from the road of approach within the plot, the rate at with the traffic flows simultaneously and continuously is limited by the frontage of plot. This flow rate of traffic units within the plot is an indicator of ease of accessibility. And the flow rate is inversely proportional to the ratio of plot dimensions. The flow of traffic in a plot is also limited by the width of road that connects the plot.

The capacity of the plot to hold the traffic within the plot and space needed for a unit to move through the plot front to either enter or exit have an equilibrium rate of flow given by their ratio which is in correlation with the ratio of the plot dimensions.

The density of traffic flow through a road with speed restrictions is limited by the road width and halved by the entering and exiting traffic. Also, the rate of decrease in the density is given by the rate of change in the ratio of the arc length and the radius of the arc.

Figure 1: Concept of Ease of Accessibility



Source:Conceptualized by Author

Mathematically given by,

$$Constant\ for\ Ease\ of\ Accessibility\ (Maximum) = \frac{Arc\ Lengt\ of\ Circle}{Diameter\ of\ Circle} \quad (1)$$

Source: Expression based on Figure 1, given by Author

On solving, we get kmax=r22r=2=1.57. Thus, the Constant is limited by k≤2. It is observed in practice that a conservative value of k=1.5 is taken.

Too Narrow Plots:
The ratio of Road Width to Plot Front can be determinant of a narrow plot. If the plot front is less than the road width, the plot becomes narrower. A plot to become too narrow when this ratio becomes greater than the constant of ease of accessibility.

Mathematically given by,

$$\frac{Road\ Width\ (w)}{Plot\ Front\ (f)} > Constant\ for\ Ease\ of\ Accessibility\ (k) \quad (2)$$

Source: Expression based on Figure 1, given by Author

When a plot gets narrower, its ease of accessibility is adversely affected, and this results in reduction in the value of the plot. Boolean of Equation 2 determines if the plot is too narrow. The value is proportionally adjusted by reduction as the constant of proportionality for Equation 2,

Mathematically given by,

Reduction=Constant for Ease of AccessibilityRoad Width to Plot Front Ratio (3)

Source: Derived from Equation 2

Too Long Plots:
The relation between the ratio of Plot Length and Breadth to the ratio of road width and plot front with the Constant for Ease of Accessibility can be determinant of a long plot.
Mathematically given by,

Road WidthPlot Front*k<Plot LengthPlot Breadthk (4)

Source: Expression based on Figure 1, given by Author

Boolean of Equation 4 determines if the plot is too long. The value is proportionally adjusted by the proposed auxiliary method.

Auxiliary Method for Reduction based on Principle of Belting:
When the plot is too long, the proposed auxiliary method can be used. According to this method, the usage potential and value are proportional to the auxiliary length of the belt. Considering the Constant for Ease of Accessibility in the relation given in Equation 4, we write the simplified equation for a generalized rectangular plot where Road Front f=Plot Breadth(b),

l=w*k2 (5)

Source: Conditionally Derived from Equation 4

For computing the length of each belt, the influence of the ease of accessibility is distributed within the plot in successive iterations of a polynomial function of single determinant that is obtained from equation 5.

Mathematically ***nthBelt Length*** is obtained by,

$$ln=kn-1*x \quad (6)$$

Source: Derived from Equation 5

The Ratio of Successive Belt Length is proportional to the reduction factor and the difference between the reduction of successive Belt keeps reducing.

Mathematically,

$$lBn-1lBn\propto-v(lBn \quad (7)$$

Source: Based on Equation 6, Expression given by Author

This also implies that this difference is inversely proportional to the number of iterations.

Mathematically,

$$\Delta vBn1n \quad (8)$$

Source: Derived from Equation 7

Significance of this concept is that the reduction factor is based on the function, and it is not concerned with the proportion or uniformity of successive reductions. The multiplier is computed by the division of the determinant (k). The converging function whose limits are determined by the significance of the difference in the value of successive iterations for the determinant (k).

Mathematically,

$$fMnk=1-kn-1-1kn \quad (9)$$

Source: Derived from Equation 7

This equation is computed for each iteration to find reduction of each belt. Based on the computations of fmRn, This approximation can be computed for all the higher iterations as shown in Table 1.

Table 01: Converage Calculation

Belt	K - Power Iterations	Sum	Function	Convergence Ratio	Multiplier	(Graph Points)	Difference	
							Value	Percentage
0	1	1	0					
1	1.5	2.5	1.5	0	1	(1,1)		
2	2.25	4.75	3.75	0.4	0.6	(2,0.6)	0.4	40%
3	3.375	8.125	7.125	0.526315789	0.473684211	(3,0.473684210526316)	0.126315789	21%
4	5.0625	13.1875	12.1875	0.584615385	0.415384615	(4,0.415384615384615)	0.058299595	12%
5	7.59375	20.78125	19.78125	0.616113744	0.383886256	(5,0.383886255924171)	0.031498359	8%
6	11.390625	32.17188	31.17188	0.634586466	0.365413534	(6,0.365413533834586)	0.018472722	5%
7	17.0859375	49.25781	48.25781	0.645944633	0.354055367	(7,0.354055366682856)	0.011358167	3%
8	25.62890625	74.88672	73.88672	0.653132435	0.346867565	(8,0.346867565424266)	0.007187801	2%
9	38.44335938	113.3301	112.3301	0.657764332	0.342235668	(9,0.342235668457566)	0.004631897	1%
10	57.66503906	170.9951	169.9951	0.660784145	0.339215855	(10,0.339215855234813	0.003019813	1%
11	86.49755859	257.4927	256.4927	0.66276792	0.33723208	(11,0.337232080137522	0.001983775	1%
12	129.7463379	387.239	386.239	0.664077596	0.335922404	(12,0.335922403739487	0.001309676	0%
13	194.6195068	581.8585	580.8585	0.664945077	0.335054923	(13,0.335054922954031	0.000867481	0%
14	291.9292603	873.7878	872.7878	0.665520913	0.334479087	(14,0.334479087229117	0.000575836	0%
15	437.8938904	1311.682	1310.682	0.665903705	0.334096295	(15,0.334096295097442	0.000382792	0%

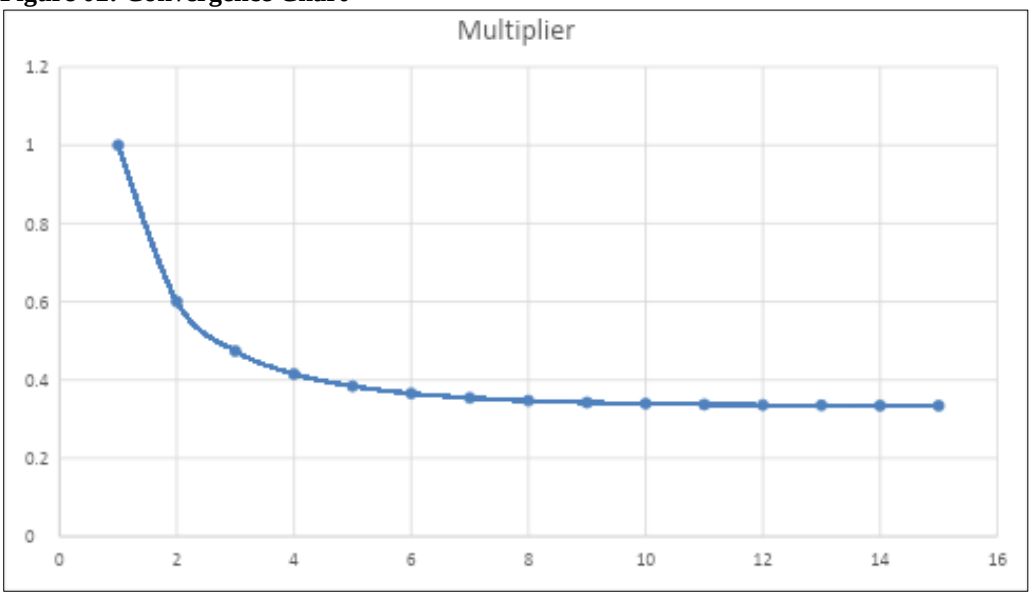
If computed for infinity, the function converges to 0.33

$$\Delta fMnk \rightarrow 0$$

$$fMnk = 0.33$$

As the number of Belts keep increasing, the difference between the reduction of each belt keeps on reducing and becomes insignificant.

Figure 02: Convergence Chart



Source: Prepared by Author

The computation of the values shown in Table 1 that create the curve indicates that the reduction is significant only up to 3 Belts. This explains why in practice, it is observed that only nBelts$=3$ are used. Although, this inference also implies that such restriction is not required and is up to the user.

Discussions

The concept discussed above gives clarity on the ambiguous Belting Method of Valuation with proper logic and reasoning. This method is implemented for valuation of adjacent properties and the valuations were accepted by all the concerned parties. The details about this are given in the case study.

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