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Design of Roadways Using Open Road Software

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Abstract – Open road software is the latest technology used for designing of roadways. This paper is an analytical comparison of conventional method of highway design and design of highway using open road software. This paper studies the methodology of designing of roadways by comparison with conventional method .Role of software is to provide an accurate means for designing of roadways with predictable and current standards of roadways design and geometric design of highways in 2D and 3D nature.

Keywords – Open Road Software, 2D and 3D Design, Comparative Study of Software and Conventional Method.

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I. INTRODUCTION

An important, though often neglected, factor in the development of strategies for the delivery of public services is the design of service routes. Highway capacity, traffic safety, and driver comfort are directly related to the geometric features of the road. Therefore, highway geometric design has been an important phase in the highway design process. In this phase, designers set the dimensions of the visible elements of the highway to satisfy the vehicle stability, sight distance, driver comfort, drainage, and aesthetics within the practical limitations of the driver and vehicle capabilities and topography.

Traditionally the alignment of a designed highway is constructed mathematically as a combination of straight line segments and arcs of circles. Design standards for modern highways require a smooth transition between straight line segments and circles, or circles of different radii. In traditional highway design, the alignment is evaluated in the map. Designers have to calculate details such as the design speed, radius of curve, super elevation, arc length, tangent length, and middle ordinate etc.

Road engineering has rapidly developed in recent years. Introducing advanced software environments and standards for highway design may have several advantages. First, configuration of a system controller for a particular intersection could be simplified, thereby reducing time and programming expertise required. Second, communication options may be increased and made more flexible, thereby aiding corridor-level control technologies. Finally, flexible software platforms would allow "standard" devices to be used in new applications Open road software i.e. open rapid object application development technology provides common work flow, data structure and modelling tools that civil engineering Organizations need to meet today's information modelling and accelerated project delivery requirement.

It helps:

- Increased predictability of cost and schedule
- Reduced probability of project failures
- Improved operational performance
- Better achievement of business goals
- Better definition of risks
- Fewer scope changes

II. LITERATURE STUDY

[2.1] ZHANC CHI, MA XIONG-YING, WANG SHI-WEI, GONG QUAN – (2016): Based on the analytic hierarchy(AHP),a multi-factor evaluation was established for analyzing the advantages of different road alignment fitting methods and providing guidance on selecting linear fitting methods for road reconstruction and extension engineering. Through this evaluation system, the reliability, precision, and

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difficulty degree of the least squares, MATLAB, and cubic spline curve methods were evaluated. Results show that the least squares method exhibits the highest precision; the MATLAB method achieves the strongest stability; and in terms of difficulty degree, the cubic spline curve method is the simplest method. The results quantify the evaluation factors and provide suggestions for selecting an appropriate and effective road fitting method under different conditions. The results also provide a reference for evaluating road alignment methods.

[2.2] Chen-Fu Liao, David M. Levinson ;(SEP.2013). Traditionally, transportation engineering students have used engineering drawing techniques to manually lay out lines and curves over contour maps for highway geometric design. The design process requires numerous calculations of stopping sight distance, minimum turning radius, and curve alignments to minimize economic and environmental impact and construction costs. A new software tool, Roadway Online Application for Design (ROAD), was developed to enhance the learning experience for transportation engineering students. This tool allows students to design roadway geometry efficiently and modify the design easily within given economic and environmental parameters. The objective is to provide a comprehensive tool that can be accessed easily by students in order to help them better understand geometric design. ROAD can also generate a three-dimensional roadway geometry model at final design to allow students to place themselves in the driver's seat and maneuver through the designed roadway at maximum design speed.

[2.3] SHIH-FANG HUANG, CHUN-SUNG CHEN, REN: Building information modeling (BIM) is mainly applied on the generation and management of building data. It utilizes the object-oriented concept to increase the efficiency of information management in the building life cycle. The track alignment data also have topographic relation that is similar to the building. This paper discusses the feasibility of applying real-time, dynamic, three dimensional building in formation model to design the alignment; compares the traditional alignment method with the BIM alignment method to find out the differences; and analyzes the precision by using alignment data of east and west main tracks of Qidu Switchyard of Taiwan Railways Administration. Moreover, the paper proves that the BIM can simplify track-alignment design, increases the abilities of computer-aided design and automation, and greatly shortens the design period.

[2.4] B.Y. HASSAN, S. M. EASA, A. O. ABD EL HALIM; (JULY.1997): In this paper, a model developed by the writers is used to study the effects of considering three dimensional (3D) alignment on design requirements for sight distance. First, the paper examines the required minimum radius of a horizontal curve combined with a crest or sag vertical curve in a section. Also, the required minimum length of a crest vertical curve combined with a horizontal curve in a fill section is studied. The results show that the 3D design requirements may differ significantly from those In separate 2D projection. As a result, it is concluded that 3D-based design standards should be developed and used in highway geometric design.

2.5] JIN-YUAN WANG, JEFF R. WRIGHT; (NOVEMBER.1994): The focus of this work is the design and development of a computer-aided system for assisting in the design of network service routes. The system integrates: (1) Spatial network data; (2) multi objective heuristic optimization techniques; and (3) an interactive, user-controlled graphical interface. The result is a systematic methodology for evaluating route configurations that facilitates the identification of solutions that reduce service-resource requirements while at the same time im- prove the overall level of service to the network and striping, weed control, and scheduled inspection. The structure and function of this system are discussed, as well as an evaluation of its use to date by Indiana Department of Transportation maintenance engineers.

III. COMPARATIVE STUDY OF DESIGN OF ROADWAY BY CONVENTIONAL AND SOFTWARE METHOD:

For comparative study of software method and conventional method of roadways. A comparative study was carried out of the JSPM college road and the following RLs were obtained at chainage of 10m.

CHAINAGE	REDUCED LEVELS
0	100
10	99.415
20	97.860
30	97.530
40	96.520
50	95.905
60	95.325
70	94.800
80	93.777
90	92.800
100	92.541
110	91.811
120	91.351
130	91.761
140	89.981
150	89.371

1. Reduced level
2. Terrain modelling

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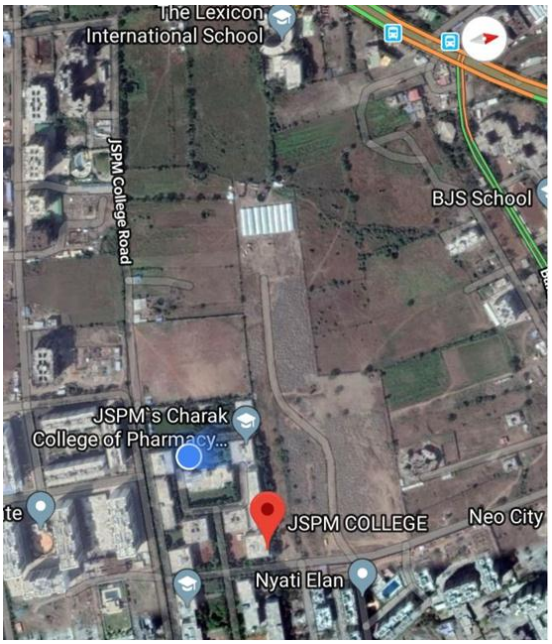
3. Road alignment

4. Aerial photography

5. Contouring

6. Geometry of road



IV. CONCLUSION:

From the above project data we concluded the following points,

- The research has reviewed agile software development (ASD) methodologies, methods and techniques against a backdrop of traditional software engineering (TSE).
- The goal of this research was to try to ascertain if this approaches to software development where compatible by considering their similarities and differences.
- It has found that in areas where one would, perhaps, initially assume there are differences (e.g. in iteration length because it is often mentioned). TSE and ASD are very similar.

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VI. REFERENCES

A. F. Griffth, G. E. Gibson Jr. (2001). "Alignment during Preproject Planning."Assoc. Prof., Dept. Of Civil. Engg. Univ. Of Texas, Austin, Tx 78712-1076.

D. J. Walton And D.S. Meek (1989). "Computer-Aided Design For Horizontal Alignment." Assoc. Prof., Of Computer Sci., Univ. Of Manitoba, Canada R3t 2n2.

Darcy Bullock, Chris Hendrickson (1992). "Advanced Software Design And Standards For Traffic Signal Control." Rep. Asst., Dept. Of Civil Engrg., Carnegic Mellon Univ., Pittsburgh, Pa 15213

Essam Dabbour, Said M. Easa, A. O. Abd El Halim (2004). "Radius Requirement For Reverse Horizontal Curves On Three-Dimensional Alignment. " Res. Assoc. Dept. Of Civil Engg. , Ryerson Univ., Toronto Canada M5b 2k3

Jin-Yuan Wang, Jeff R. Wright (1994). "Assoc. Prof. , Dept. Of Transp. , 1001 Univ. Road, Nat. Chiao Tung Univ. , Hinchu 30049, Taiwan."

Mary Lee Dereske-Jones (1986). "Ethics of Using Computer Software in Civil Engg. Design." Dept. Of Civil Engg., Oklahoma State Univ., 74078.

Vincent Rouillard, Ben Bruscellac, Michael Sek (2000). "Classification Of Road Surface Profiles. " Res. Student, School of Built Envir. , Victoria Univ. Of Technol. , Melbourne City Mc, Victoria 8001, Australia.

Y. Hassan, S. M. Easa, A. O. Abd El Halim (1997). "Design Considerations For Combined Highway Alignments." Prof., Dept. Of Civil Engeg. , Carleton Univ., Ottawa, Ontario, Canada K1s 5b6.

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