iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** XII **Month of publication:** December 2022

DOI: https://doi.org/10.22214/ijraset.2022.48444

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XII Dec 2022- Available at www.ijraset.com

Hybrid Annuity Model in Road Infrastructure Projects

Pragya Narayan[1], Dr. Abhijit Rastogi[2]
[1]*MBEM Student, Department of Building Engineering and Management, School of Planning and Architecture, Delhi*
[2]*Assistant Professor, Department of Building Engineering and Management, School of Planning and Architecture, Delhi*

Abstract*: Hybrid Annuity Model has grown into popularity as a PPP model for development of highways since its introduction in 2016, after declined interest in PPP to revitalize the sector. The model is considered to have the best of both worlds, as it reduces the financial burden on concessionaire, by investment of 40% of the money during construction by government and return of 60 % of the investment by concessionaire in bi-annuity over a period of 15 year. This study's objective is to provide an evaluation of the hybrid annuity model used in road infrastructure projects by analysing the model's practical issues. Through an elaborate literature study model is understood in detail from the evolution of PPP in road infrastructure, need of new PPP model with evolution of Hybrid Annuity Model in road infrastructure, Changes in MCA documents, Process of Hybrid Annuity Model, Advantages and identified issues in HAM through various authors was understood. The study focuses on 32 case studies to identify the key factor that affects the outcome/performance of the project. Furth more, the identified issued was ranked on the bases of likelihood of their occurrence and severity through Relative importance Index. Identification key factors are a must to make recommendations to make the model more robust by addressing the major issues affecting the performance of the project
Keywords: Hybrid annuity Model, Highway Projects, Delay in HAM

I. INTRODUCTION

The nation moves on its roads and highways, which are valuable resources. In India, 67% of freight and 88% of passenger traffic is transported by roads, and it is estimated that annual road traffic growth has been between 10% and 15%.. (Jichkar, Paunikar, & Walke, 2022), (India brand equity foundation, 2022). Highways that connect different sections of the nation are regarded as the most significant of all sorts of roads. For instance, National Highways (NH) account for approximately 2% of the entire road network but handle about 40% of the traffic. (Nallathiga, 2019). During the National Highways Development Project era, PPP highway construction gained popularity, with BOT projects making the most contribution. BOT model was first the most well-liked PPP model. The BOT model, which was the best strategy to generate initial private finance, was widely employed in India for road construction. The concessionaire is required to provide all initial capital under the BOT model.(CRISIL & FICCI, 2019). This trend held over fiscal 2006-2013. From fiscal 2013, interest in PPP projects declined due to several factors, such as optimistic traffic projections, the slowdown in the economy, and the build-up of non-performing assets (NPAs) in the banking sector. To overcome such issues government of India introduced the Hybrid Annuity model. To lessen the financial burden on concessionaires and get around the BOT's (both toll and annuity model) constraints, the Indian government established the new PPP model known as the Hybrid Annuity Model (HAM).

II. NEED OF THE STUDY

From the time of HAM's introduction in 2016 it has proven to be the preferred choice of the Public-private partnership model. Nearly 50% of projects awarded under HAM from fiscal 2020-22, accounting for almost half of overall road execution. Though it is reported that around 34 % of the projects are stuck, unable to increase the pace of execution due to varied reasons such as funding and land acquisition, mobilization advance from the government etc *(Vatsala Kamat, 2019).* Identifying the issues pertaining to Hybrid Annuity Model becomes very important, as in recent years it is considered the most preferred model of PPP in road infrastructure projects

III. RESEARCH METHODOLOGY

Evolution of model's usage in PPP's studied through literature to form an understanding on PPP models used in Road infrastructure projects. From the Documented studies under HAM issues pertaining in hybrid annuity model will be identified. The project in the public sector organizations of India is kept as confidential. The author requested the National Highway Authority of India to provide HAM project data. 32 Case studies are analyzed in this study.

©IJRASET: All Rights are Reserved

The Cases will be analyzed on the basis of closure duration and construction duration. The analysis helps in identifying issues affecting the progress of the Project. Factors are identified through these cases that affect the outcome of the project. Listing of factors after quantifying the highest occurrence and severity of the issues affecting the progress/ performance of the project through RII. The factors are then ranked through the Relative importance index on the bases of their occurrence and severity. The For top 6 issues suitable recommendation provided at the end of the study to make the Hybrid Annuity Model More Robust.

IV. LITERATURE REVIEW

The literature on the subject of hybrid annuity models in road infrastructure projects is reviewed in this section. Several road development contracts were awarded in accordance with the policy option utilising, among other models, the Build, Operate, and Transfer PPP model. Later, it discusses some of the noteworthy achievements made throughout the five-year programmed period in India's PPP-based road development. Finally, it analyses the main issues and challenges that have arisen in this sector's road building under the PPP model. (Nallathiga & Shah, 2013). Due to issues like the risk of toll collection and road risks that the permit holder had to bear, road services in India were unable to be finished at that time. These issues collectively have caused delays in the project's completion for building roads. Consequently, the government has created a hybrid annuity model that is more advanced than current models in order to strengthen the construction business. (Taneja & Kalra, 2019)

The HAM financial framework was created with the intention of revitalising the road industry and reducing the burden of equality on struggling developers. Due to the fact that even HAM efforts face some financial difficulties, such as a lack of funds and competitive bidding, the NHAI has initiated an endeavour to provide initial cash for integration and deployment. In five linked and historic phases totalling 20% of project work, NHAI provides 40% of the overall cost of government building finance for HAM projects, with the remaining 60% being determined by the permit holder. (Sawant & Kulkarni, 2018). A new hybrid annuity model for public-private partnerships was created in 2016 to rekindle investment in India's highway infrastructure and to mend the sour relationship between public and private businesses. Since it is accepted that real performance testing is impractical at this early level of HAM, the research takes a more analytical approach to detecting potential issues based on the descriptive features provided by project bidding and reward data. This study provides new insights and updates to earlier studies on the role of the state and other stakeholders in the recently adopted PPP model. (Garg, 2019).

Numerous hazards affect infrastructure development projects and can determine whether they succeed or fail. These risks include both contractual risks (such as risks related to completion, operation, market, finance, environment, and technology) and non-contractual risks (such as risks related to politics, the law, the economy, and operation). (Kalidindi & Thomas , 2002). Therefore, the evaluation of these risks and risk sharing during the project bidding stage determines whether infrastructure projects succeed or fail. Along with macro- and meso-level influences, project-level or micro-level influences also have an impact on project outcomes. Numerous earlier studies have demonstrated how important it is for project managers to have some sort of pre-planning framework to address these crucial elements. A McKinsey survey of construction companies and a study commissioned by the Planning Commission both imply that 70 to 90 per cent of road projects experience delays in land acquisition. According to various authors, (Upadhyay & Sinha, 2009), (Singh K. , 2011), (Raghuram, Sebastian , & Satyam, 2010) (Nallathiga & Shah, 2013) one of the main obstacles to building roads and highways in India is acquiring land.

(Zhang, 2005) made an extensive analysis in an effort to identify the crucial success elements for PPP in infrastructure development. Five key success criteria were noted by the author: a favourable investment climate, economic feasibility, a dependable concessionaire consortium with technical strength, a solid financial package, and adequate risk distribution (through reliable contractual arrangements). A survey was conducted on all major and sub-factors, including both industrial and academic responder groups, and various sub-factors within each of the factors were also identified. The study's significance index was used to create a list of the main factors and sub-factors, which were then sorted. In order to rank the key success variables, the author also conducts an agreement analysis with both responder groups.

According to (Singh R. , 2010) one of the main reasons for infrastructure project cost overruns is delays. In comparison to smaller initiatives, larger ones have had more cost overruns. Similarly, projects in the road, rail, and urban development sectors, as well as those in civil aviation, shipping and ports, and the electricity sector, have seen larger delays when compared to other sectors. Analysis reveals that some delays and cost overruns were unavoidable because of ineffective methods and gaps in the contract. These delays, nevertheless, were too frequent and significant to be explained by faulty methods, incomplete contracts, and inflationary swings.

Research on resource-related delays in the Indian construction industry was done by (Venkatesh, Umarani , Renuga , & Balasubramanian , 2011).

The causes of delays were asked for from different construction professionals working in different construction firms using a standardised questionnaire survey and a Likert scale.

The results of the responses underwent statistical analysis, and conclusions on the influence of several important elements were made. The Relative Importance Index (RII), which was used to rank them to indicate their relevance, was also utilised to identify the key components.

Using a diagnostic approach, (Rajan, Gopinath, & Behere, 2014)studied the factors influencing the progress of infrastructure projects in terms of cost/time overruns and determined the significance of (a) technical parameters, (d) economic parameters, and (c) state-specific factors. A professional survey was also carried out utilising a significant Likert scale. Finally, depending on the ranking of parameters using the Relative Importance Index, they present the success/failure factors inside each of the primary parameters (RII). The breadth and depth of the issues surrounding project success/failure have been addressed in a significant amount of international and Indian literature, as is evident. Different studies have employed various frameworks, but the majority of them used ranking analysis based on mean scores or the RII or its variants to identify critical issues.

V. CASE STUDIES AND ANALYSIS

This section pertains to the case study considered for this research, the focus of which is to identify the factors affecting the success of Hybrid Annuity Model.

Restricting to only NHAI's conceived HAM projects, the data was compiled and cross verified on highway projects bid out during January, 2016 to March, 2021 from various sources such as company websites, annual reports, and NHAI website. Data collected for 32 different HAM cases with varied project status, bid out during January 2016 to March 2021. Out of 32 projects under consideration, 2 Projects are terminated, 5 Projects under Operation and Maintenance stage (CC issued), 11 Projects under construction and 14 projects have achieved Provisional commercial completion.

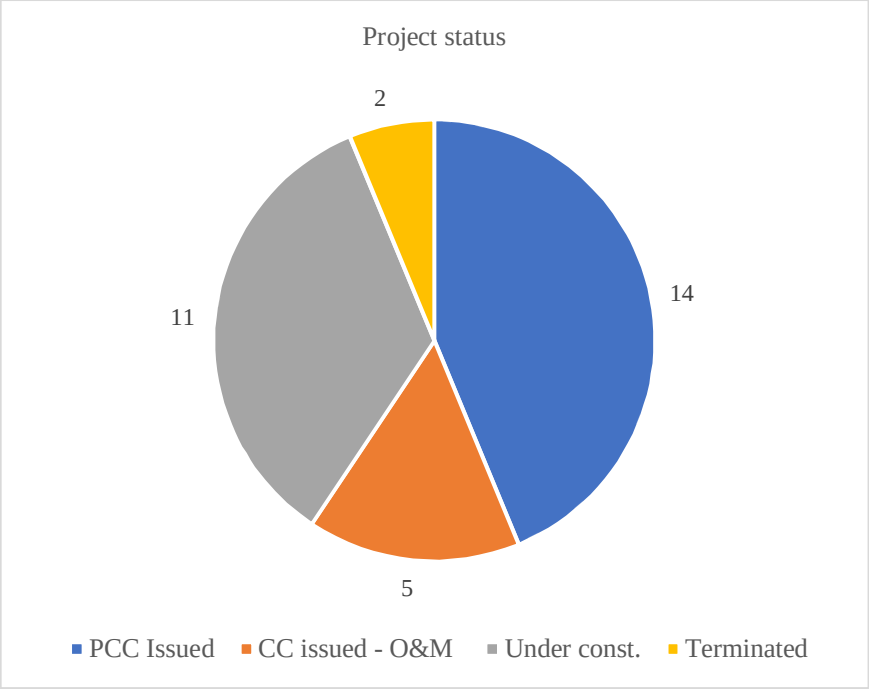


Figure 1Case study- Project status *(Source - Author)*

As per the Model concession agreement the closure is to be achieved within 150 days from signing of concession agreement. Below in Table 1 the duration between agreement date to appointment date is given. However, the data collected clearly indicated that in none of the cases was this stipulated time met. The range of achieving closure between the agreement date to appointment date is 174 days to 672 days.

Table 1Closure Duration Analysis *(Source - Author)*

CASE STUDY NO.	AWARDED in YEAR	AGREEMENT DATE-CONTRACTOR	APPOINTED DATE/START DATE-CONTRACTOR	DAYS IN ACHIEVING CLOSURE	DELAY IN ACHIEVING CLOSURE (IN DAYS)
1	2016-17	19/06/2017	24/01/2018	219	69
2	2016-17	14/06/2017	27/12/2017	196	46
3	2017-18	27/04/2018	19/07/2019	448	298
4	2018-19	16/07/2018	24/10/2019	465	315
5	2017-18	20/04/2018	15/10/2019	543	393
6	2018-19	29/01/2020	20/10/2021	630	480
7	2017-18	25/04/2018	12/01/2019	262	112
8	2020-21	21/10/2020	14/05/2021	205	55
9	2017-18	13/04/2018	04/01/2019	266	116
10	2017-18	04/07/2018	21/01/2019	201	51
11	2016-17	16/01/2017	15/01/2018	364	214
12	2016-17	10/07/2017	28/09/2018	445	295
13	2017-18	20/06/2018	14/12/2018	177	27
14	2016-17	09/06/2017	28/02/2018	264	114
15	2016-17	09/06/2017	30/11/2017	174	24
16	2016-17	19/12/2016	01/02/2018	409	259
17	2016-17	19/07/2016	09/02/2017	205	55
18	2016-17	19/07/2016	20/03/2017	244	94
19	2016-17	09/08/2016	15/05/2017	279	129
20	2016-17	08/07/2016	25/04/2017	291	141
21	2016-17	19/07/2016	07/02/2017	203	53
22	2017-18	20/06/2018	31/12/2018	194	44
23	2016-17	07/06/2017	18/05/2018	345	195
24	2016-17	07/06/2017	13/02/2018	251	101
25	2016-17	08/12/2016	21/08/2017	256	106
26	2018-19	03/12/2018	05/10/2020	672	522
27	2020-21	07/04/2021	06/04/2022	364	214
28	2018-19	06/12/2019	05/10/2020	304	154
29	2015-16	27/05/2016	28/02/2018	642	492
30	2015-16	02/06/2016	31/03/2017	302	152
31	2015-16	02/06/2016	28/10/2017	513	363
32	2017-18	14/05/2018	08/03/2019	298	148

The average overall duration of achieving closure from the collected data comes out to be 332 days with a median value of 285 days. Considering the overall allowable duration of 150 days to achieve closure the projects have suffered substantial time loss. The difference in the value is significant in the overall duration of achieving closure. The range of delay in the duration of achieving closure between the agreement date to the appointment date is 522 days to 24 days. With an average of 182 days and a median value of 135 days. The higher duration between the Agreement Awarded date to the Appointment date indicates a point of pain in the process of achieving closure.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

Probable factors affecting this may be -

1) Delay in acquiring 80% of Land to start construction as per MCA
2) Delay in Achieving Financial Closure
3) Delay in obtaining Permits
4) Government unable to provide Mobilization advance

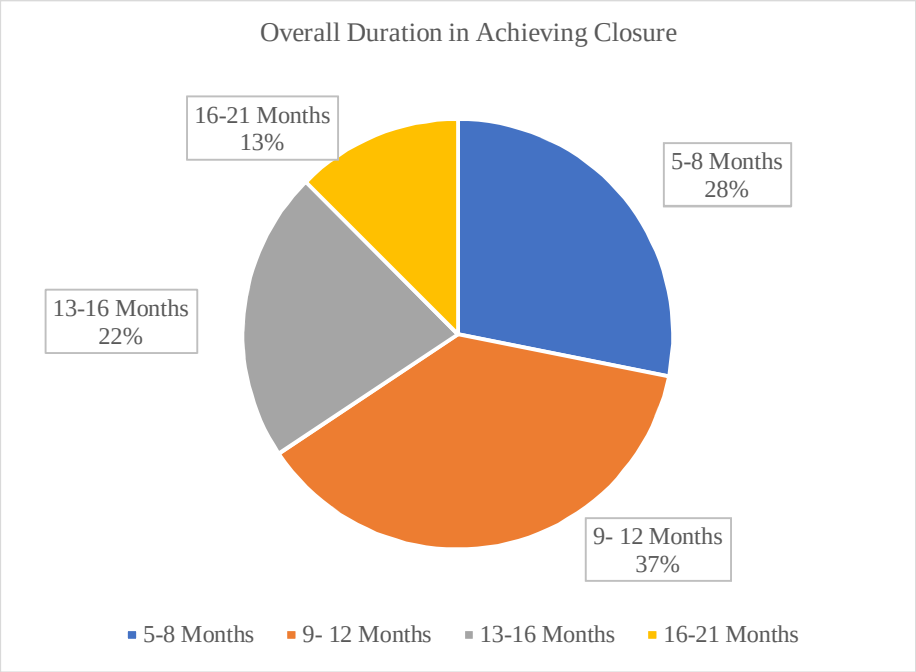


Figure 2 overall duration in achieving closure *(Source - Author)*

Below in table 2 the duration between scheduled construction period to Actual construction period is given. As per MCA the concession period includes permanent operational period of fifteen years from COD. Therefore, regardless of the delay in PCOD's action, the number of annuities is set at thirty. However, in order to compensate the concessionaire for any delays, the authority may impose fines or withhold performance bonds. There is also provision for bonus in case of completion before time. However, the data collected clearly indicates that in none of the cases the original scheduled time is met. The range of construction period from the appointed date to the scheduled construction period is 1633 days to 729 days.

The average overall likely duration of construction period from the collected data comes out to be 1476 days with a median value of 1515 days. Considering the scheduled duration of construction period, the projects have suffered substantial delay. The higher rate of delay in construction may be due to following factors.

Probable factors affecting this may be –

a) Delay in acquiring remaining Land for construction
b) Delay in payment by government
c) Modification scope of work
d) Delay in issuing various approval/ clearance documents
e) Rework due to errors during construction
f) Lack of adequate and skilled manpower in construction team
g) Delay in inspection of work by consultant
h) Faulty DPR – Poor site condition
i) Poor communication and coordination between project's parties
j) Force Majeure
k) Public agitation demanding other facilities (law and order problem)

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XII Dec 2022- Available at www.ijraset.com

Table 2 Construction duration analysis *(Source - Author)*

Case study no.	Awarded in Year	Appointed Date	Scheduled completion date as per Contract	Likely Completion Date	Construction Period (scheduled) (in days)	Likely Construction Period (Actual)(in days)	Delay
1	2016-17	24/01/2018	24/07/2020	30/09/2022	912	1710	88%
2	2016-17	27/12/2017	26/06/2020	30/09/2022	912	1738	91%
3	2017-18	19/07/2019	18/07/2021	28/03/2022	730	983	35%
4	2018-19	24/10/2019	23/10/2021	30/09/2022	730	1072	47%
5	2017-18	15/10/2019	12/04/2022	31/10/2022	910	1112	22%
6	2018-19	20/10/2021	19/10/2023	19/10/2023	729	729	0%
7	2017-18	12/01/2019	09/07/2021	18/11/2022	909	1406	55%
8	2020-21	14/05/2021	13/05/2023	09/08/2023	729	817	12%
9	2017-18	04/01/2019	04/04/2022	30/11/2022	1186	1426	20%
10	2017-18	21/01/2019	18/07/2021	31/10/2023	909	1744	92%
11	2016-17	15/01/2018	13/07/2020	31/05/2022	910	1597	75%
12	2016-17	28/09/2018	26-12-2021	30/04/2022	1185	1310	11%
13	2017-18	14/12/2018	12/06/2021	30/09/2022	911	1386	52%
14	2016-17	28/02/2018	26/08/2020	31/01/2022	910	1433	57%
15	2016-17	30/11/2017	27/05/2020	31/01/2022	909	1523	68%
16	2016-17	01/02/2018	30/07/2020	31/12/2022	910	1794	97%
17	2016-17	09/02/2017	09/08/2019	30/09/2022	911	2059	126%
18	2016-17	20/03/2017	16/09/2019	31/10/2022	910	2051	125%
19	2016-17	15/05/2017	15/11/2019	30/06/2021	914	1507	65%
20	2016-17	25/04/2017	22/10/2019	30/06/2021	910	1527	68%
21	2016-17	07/02/2017	06/08/2019	30/09/2022	910	2061	126%
22	2017-18	31/12/2018	30/12/2020	31/08/2022	730	1339	83%
23	2016-17	18/05/2018	04/08/2022	31/08/2022	1539	1566	2%
24	2016-17	13/02/2018	04/08/2022	30/09/2022	1633	1690	3%
25	2016-17	21/08/2017	20/08/2019	23/12/2023	729	2315	218%
26	2018-19	05/10/2020	04/10/2022	02/02/2023	729	850	17%
27	2020-21	06/04/2022	12-04-2024	12/04/2024	737	737	0%
28	2018-19	05/10/2020	04/10/2022	06/03/2023	729	882	21%
29	2015-16	28/02/2018	27/02/2020	31/08/2022	729	1645	126%
30	2015-16	31/03/2017	30/03/2019	31/12/2022	729	2101	188%
31	2015-16	28/10/2017	27/10/2019	31/10/2022	729	1829	151%
32	2017-18	08/03/2019	07/03/2021	15/10/2022	730	1317	80%

VI. RESULT

Roads and highways are important assets, on which the nation moves. Roads carry about 67% of freight and 88% of passenger traffic in India and it is estimated that the road traffic has been growing at 10-15% per annum. (Jichkar, Paunikar, & Walke, 2022), (India brand equity foundation, 2022).

Among all types of roads, highways connecting various parts of the country are considered the most important. For example, National Highways (NH) constitute only about 2% of the total road network but cater to nearly 40% of the road traffic. (Nallathiga, 2019). Construction of Highways through PPP model gained attraction during the National highways Development Project era, with BOT Projects contributing the most.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

Factors identified through the analysis of 32 cases affecting the progress of the project are:

Table 3 Issues Pertaining in Hybrid Annuity Model *(Source- Author)*

S.NO.	FACTOR CODE	DESCRIPTION	Occurrence (Out of 32)	% Of OCC.	RANK
1	F1	Delay in land acquisition	32	100.00	1
2	F2	Delay in payment by the government	15	46.88	6
3	F3	Modification in the scope of work	16	50.00	5
4	F4	Delay in issuing various approval clearance documents.	17	53.13	4
5	F5	Delay in Financial closure	28	87.50	2
6	F6	Lack of adequate and skilled manpower in contractor's team	6	18.75	7
7	F7	Delay in inspection of work by consultant	2	6.25	13
8	F8	Defaut in DPR - Poor site condition	3	9.38	12
9	F9	Poor communication and coordination between project's parties	4	12.50	11
10	F10	Force Majeure	19	59.38	3
11	F11	Public agitation demanding other facilities (law and order problem)	6	18.75	8
12	F12	Rework due to errors during construction	1	3.13	14
13	F13	Delay in shifting of various utilities	5	15.63	10
14	F14	Fluctuation in price of material and equipment	6	18.75	9

A. Relative Importance Index (RII)

The contribution of each of the factors to overall delays was examined, and the ranking of the attributes in terms of their criticality as perceived by the respondents was done by use of the Relative Importance Index (RII), which was computed using the equation, and the results of the analysis are presented in the following section.

$RII = \sum W / A \times N$

Simply for understanding, the formula can be written in the following way

$RII = 3(N3) + 2(N2) + 1(N1) / A \times N$

Where,

N3 = Nos. of respondents for significant impact

N2 = Nos. of respondents for average impact

N1 = Nos. of respondents for slight impact

Table 4 Issues in HAM Projects by RII Method *(Source -Author)*

FACTOR ID	DESCRIPTION	∑W	A	N	RII	RANK
F1	Delay in land acquisition	71	3	32	0.74	1
F2	Delay in payment by the government	33	3	32	0.34	6
F3	Modification in the scope of work	41	3	32	0.43	4
F4	Delay in issuing various approval clearance documents.	36	3	32	0.38	5
F5	Delay in Financial closure	65	3	32	0.68	2
F6	Lack of adequate and skilled manpower in the contractor's team	7	3	32	0.07	10
F7	Delay in inspection of work by consultant	4	3	32	0.04	13
F8	Defaut in DPR - Poor site condition	7	3	32	0.07	12
F9	Poor communication and coordination between project parties	9	3	32	0.09	11
F10	Force Majeure	50	3	32	0.52	3
F11	Public agitation demanding other facilities (law and order problem)	15	3	32	0.16	8
F12	Rework due to errors during construction	3	3	32	0.03	14
F13	Delay in shifting of various utilities	15	3	32	0.16	9
F14	Fluctuation in the price of material and equipment	18	3	32	0.19	7

From table 3 and 4, on the basis of occurrence and severity factor F1,F5,F10 gets the Highest Relative Importance Index with a value of 0.74,0.68,0.52 respectively, indicating high likelihood of occurrence and severe impact on the performance of the project. Factor “F3” identified through case study may be considered as a factor which is not very likely to occur but have a moderate impact. Similarly, Factor “F4” may be considered as a factor which is likely to occur but have a moderate impact. we find that Factor F1- “Delay in Land Acquisition” may be considered as a factor which is very likely to occur and does impact the progress of the Project. From the list (table 9) the top 6 factors were taken on the basis of rank and analysed with respect to clauses in the model concession agreement, work manual, bills passed to make suitable recommendation. Factor F1, F5, F10,F3,F4,F2 gets the highest Relative Importance Index with a value of 0.87, 0.78,0.56,0.46,0.45,0.41, respectively, indicating high likelihood of occurrence and severe impact on the progress/performance of the project. Factor F5- which is - “Delay in Financial Closure” has the second highest RII Value of 0.78, is the second most occurring factor.

Top 6 Issues Pertaining in Hybrid Annuity Model

1) Delay in Land Acquisition
2) Delay in Financial Closure
3) Force Majeure
4) Delay in issuing various approval/ clearance documents.
5) Delay in payment by the government
6) Modification in the scope of work

VII. RECOMMENDATION

The following recommendations have been made based on current study

1) Related compensation and rehabilitation to be completely taken care of before entering into agreement with the private entity. Instead of 80% land acquisition at 3G stage, the project should start at 3H stage.
2) Identify the time taken by the system for land acquisition and allot a period for land acquisition before RFP stage or simultaneously.
3) Completion of major portion of land acquisition prior to initiation of bid

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

4) The Government can explore ways to possibly make the parties affected in land acquisition as stake-holders in the NH Road construction projects by ensuring means for regular income for them for a specific period of time, so that public resistance to acquisition of land may be reduced and disputes regarding amount of compensation/valuation of land may be mitigated
5) Single window interface system should be made popular and put into action – this is not only increase transparency but also save time in getting approvals from various departments smoother.
6) Award of projects after adequate preparation in terms of land acquisition, clearances etc. And process of obtaining clearances from different ministries/department would commence as soon as the alignment is finalized and final feasibility report is submitted.
7) Correctly worked out utility estimates is to be obtained at the earliest after the alignment finalization and shall form part of appraisal proposal
8) The process of project appraisal to commence at the earliest on receipt of the final detailed project report (DPR) and technical schedules
9) The Government should make timely allocation of funds and ensure that the financial and physical targets set for Bharatmala Pariyojana Phase-I and other ongoing schemes for development of Roads/National Highways are effectively completed in a time bound manner so as to avoid time and cost overruns.
10) NHAI should shift its focus to execution instead of awarding new road projects going forward, given the burden of soaring land acquisition costs and rising debt on its books

VIII. CONCLUSION

In an effort to expand India's highway system, the government of India (GOI) unveiled the National Highway Development Plan (NHDP) in 1997. However, in order to revive PPP, the government of India introduced the Hybrid Annuity Model (HAM) in road development due to the huge number of PPP projects that have stopped due to financial instability. With the revised risk allocations that HAM has brought about, project wins in the highway industry have increased. Without a doubt, HAM has successfully increased private engagement in the domain of road development through improved risk allocation. The study shows that even if the improved risk allocation is unquestionably a step in the right direction, HAM violates the core PPP tenets of optimal risk allocation and utilising private sector efficiencies.

Some significant problems for the sector still exist. The process of buying land is still ambiguous. A more efficient dispute resolution process, proper project development and planning, and a more equitable risk distribution are all necessary. It has been challenging to complete projects financially since financing continues to be an issue, particularly with regard to the availability of stock. The recently developed HAM projects are also having trouble closing. Developer and financier problems are still being made worse by equity restrictions and an increase in non-performing assets. A modification in the scope of work or descoping is one of the primary elements determining the performance of the hybrid annuity model, even if there is a clause for descoping the land in the event that the government is unable to acquire it within 150 days of the agreement's signature. Some of the main issues the Hybrid Annuity Model is facing include delays in moving various utilities, public unrest (a problem with law and order), flawed DPR, inadequate feasibility reports, the release of construction grants, and mobilisation advances.

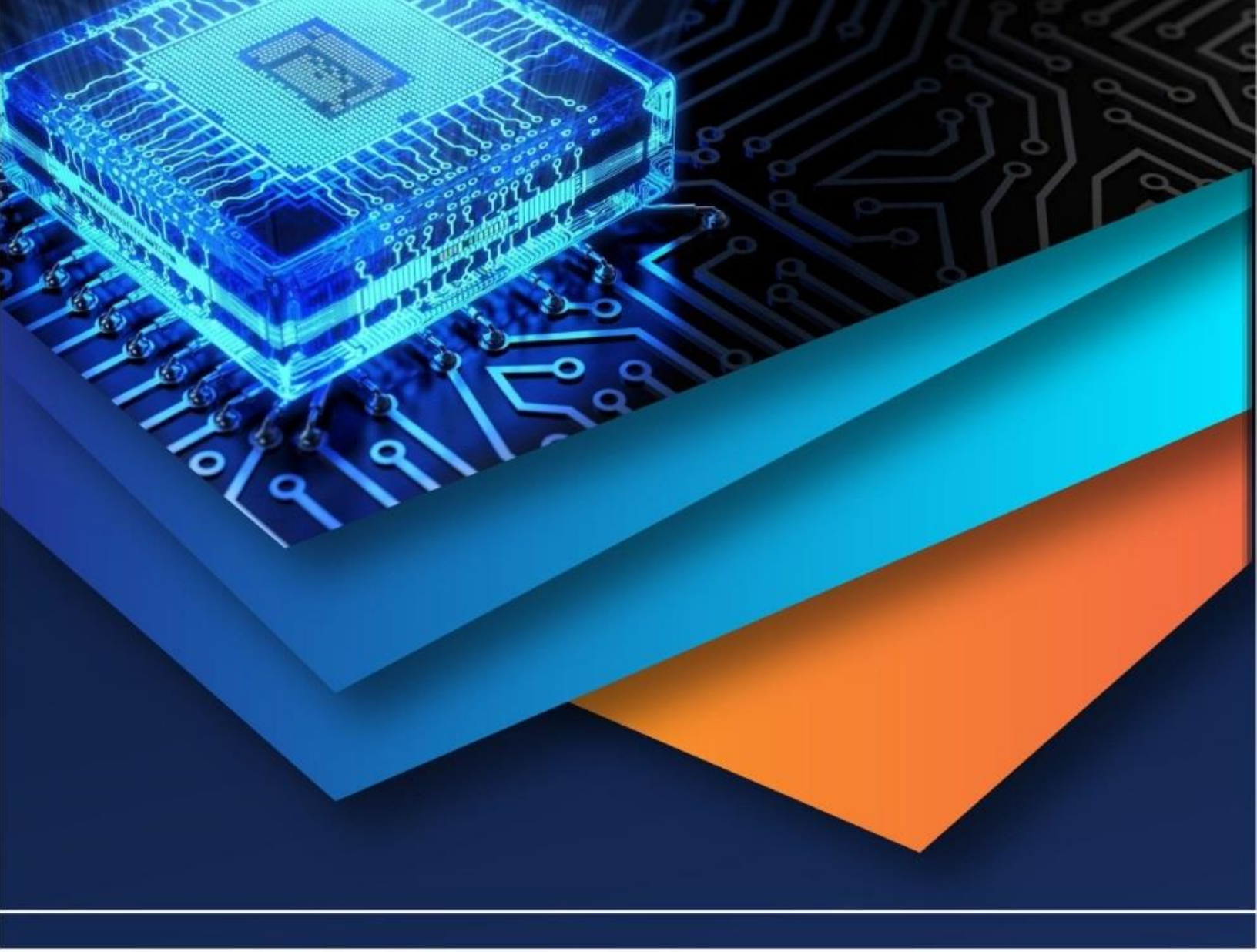
REFERENCES

[1] Ministry of Finance Department of Economic Affair. (2020). National Infrastructure Pipeline Report of the Task Force (Volume I). Delhi: Government of India.
[2] Ministry of Road Transport and Highways. (2016). National Highways Authority of India circular on Hybrid Annuity Model for implementing highway projects. Delhi.
[3] Crisil Research. (2019). HAM paves ahead but cracks appear, too.
[4] CRISIL, & FICCI. (2019). Rekindling private investment in roads and highways. Infrastrucutrure Advisory by CRISIL, 1-32.
[5] Department of Economic Affairs. (2012). Retrieved from https://www.pppinindia.gov.in/.
[6] Department of Economic Affairs. (2020). Retrieved from https://www.pppindia.gov.in/
[7] Garg, S. (2019). Hybrid Annuity Model: Hamming risk allocations in highway PPPs in India. Journal of Public Affairs .
[8] Gatare, D., & Attar, A. (2017). Risk in Highway Project Based on Operation and Maintenance. International Journal of Innovative Research in Science, Engineering and Technology , 8975-8984.
[9] Government of India, Planning Commission . (2013). Twelfth Five-Year Plan, 2013–2017, Volume I.
[10] India brand equity foundation. (2022, august). Road infrastructure of India. Retrieved from India brand equity foundation: https://www.ibef.org/industry/roads-india
[11] Jethani, S. (2018). Risk allocation in PPP Road infrastructure Projetcs in india.
[12] Jichkar, R., Paunikar, M., & Walke, M. (2022). Study of Hybrid Annuity Model on Maharashtra Samruddhi Mahamarg. International Journal for Research in Applied Science & Engineering Technology, 2121-2123.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

[13] Kakati, M., & Baruah, P. (2016). optimal risk allocation in public- private partnership project in india. Boston, USA: WEI International Academic Conference Proceedings.
[14] Kalidindi, S., & Thomas , A. (2002). 'Private sector participation in road projects in India: assessment and allocation of critical risks. oxford: Blackwell Publishers.
[15] Kalindindi, S., & Thomas, A. (2002). 'Private sector participation in road projects in India: assessment and allocation of critical risks. In PublicPrivate Partnerships: Managing risks and opportunities (pp. 317-350). oxford: Blackwell Publishers.
[16] Ministry of Road transport & Highways. (2019). Basic Road Statistics of India 2016-17. new delhi: Transport Research Wing.
[17] MORTH. (2020, November). Model Concession Agreement for Hybrid Annuity Project. Government of India Ministry of Road Transport and Highways.
[18] Nallathiga, R. (2019). Highways and Road Development in India: Progress and Prospects. MEDC Ecconomic Digest, Volume II, No. 4,, pp 13-17.
[19] Nallathiga, R., & Shah, M. (2013). Public-private Partnerships in Road development sector in India. New Delhi: Public Private Partnership: The Need of the Hour, Bloomsbury Publishing India Pvt Ltd,.
[20] Nallathiga, R., Shaikh, H., Shaikh, T., & Sheik, F. (2017). Factors affecting the success/failure of road infrastructure projects under PPP in India. KICEM Journal of Construction Engineering and Project Management .
[21] National highway of India. (2019, March 23). Retrieved from nhai.gov.in: http://nhai.gov.in/about-nhdp.htm
[22] NHAI. (2019). National Highways Authority of India, Indian Road Network. Retrieved from http://www.nhai.org.: http://www.nhai.org/roadnetwork.htm.
[23] Peri, R., Chen , c., & Dey , D. (2019). HYBRID ANNUITY MODEL CONTRACTS FOR ROAD PROJECTS IN INDIA. Philippines: ADB SOUTH ASIA WORKING PAPER SERIES, Creative Commons Attribution.
[24] Planning commission . (2014). Public Private Partnership in Annuity Projects: Model Concession Agreement. Delhi. .
[25] Press information bureau. (2015). Report of the Committee on Revisiting & Revitalising the PPP Model of Infrastructure Development Chaired by Dr. V.Kelkar Released, Ministry of Finance,. Retrieved from pib.nic.in: http://pib.nic.in/newsite/PrintRelease.aspx?relid=133954
[26] press Information Bureau. (2016). Hybrid Annuity model for implementing highway projects,. Retrieved from pib.nic.in: http://pib.nic.in/newsite/printrelease.aspx?relid=135821
[27] Raghuram, G., Sebastian , M., & Satyam, S. (2010). Mega Projects In India: Environmental and Land Acquisition Issues in the Road Sector. Research Paper, Indian Institute of Management, Ahmadabad.
[28] Rajan, T., Gopinath, G., & Behere, M. (2014). PPPs and Project overruns: Evidence from Road Projects in India. Journal of Construction Engineering and Management .
[29] Reserve Bank of India. (2015-18). Data on Sectoral Deployment of Bank Credit, India. https://m.rbi.org.in/Scripts/Data_Sectoral_Deployment.aspx#mainsection. .
[30] Sawant, M., & Kulkarni, A. (2018). Analysis of hybrid annuity model (ham) for ppp in highway project. Pune: dr. D. Y. Patil institute of engineering, management and research.
[31] Shiwakoti, D., & Dey, D. (2022). THE HYBRID ANNUITY MODEL FOR PUBLIC-PRIVATE PARTNERSHIPS IN INDIA'S ROAD SECTOR. ADB SOUTH ASIA WORKING PAPER SERIES.
[32] Singh, K. (2011). Issue and Prospects Of Public Private Partnership In India. International Journal Of Multidisciplinary Research.
[33] Singh, R. (2010). "Delays and Cost Overruns in Infrastructure Projects: Extent, Causes and Remedies. Economic and Political Weekly of India Vol - XLV No. 21.
[34] Singh, V., & Madurwar, M. (2019). Hybrid Annuity Projects: Study of HAM in Highway Construction Projects. The Sustainable Infrastructure Development and Management conference.
[35] Surabhi, & Kondratieva, K. (2018). Lending to infrastructure sector sees negative growth in last. Retrieved from The Hindu Business Line: s. https://www.thehindubusinessline.com/money-and-banking/lending-to-infrastructure-sector-sees-negativegrowth-in-last-two-fiscals/article24391821.ece.
[36] Taneja , A., & Kalra, D. (2019). Analysis of hybrid annuity model in construction. New Delhi: Bureau For Health And Education Status Upliftment.
[37] Taneja, A., & Kalra, D. (2019). Analysis of hybrid annuity model in construction.
[38] Upadhyay , V., & Sinha, C. (2009). "Regulatory and Policy Regime of Land Acquisition: A State-level Perspective, India Infrastructure Report 2009. Delhi: , Oxford University Press.
[39] Vatsala Kamat. (2019, march). HAM Road Projects are in Jam as Land Acquisition Issues Persist. Retrieved from www.livemint.com : https://www.livemint.com/market/mark-to-market/ham-road-projects-are-in-jam-as-land-acquisition-issues-persist1551652524852.html
[40] Venkatesh, M., Umarani , C., Renuga , S., & Balasubramanian , M. M. (2011). Analysis and Identification of Critical Factors of Delay in Construction Projects. NICMAR : Journal of Construction Management, Volume XXVI, Issue 2.
[41] Zhang, X. (2005). Critical Success Factors for Public-Private Partnerships in Infrastructure Development. ASCE Journal of Construction Engineering and Management .

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)