Influence of Prefabrication Technology on Cost & Time Dealing With Microsoft Project

MUKUNDA B. SHEP¹, PROF. ASHISH P. WAGHMARE²

¹PG Scholar, Construction & Management, Dept. of Civil Engineering, D. Y. Patil School of Engineering & Technology, Pune

²PG Coordinator, Construction & Management, Dept. of Civil Engineering, D. Y. Patil School of Engineering & Technology, Pune

Abstract -- This paper proposes a model for quantitatively evaluating the possible impacts arising from the application of prefabrication technology on construction. The object of this paper is to identify new technologies or methodologies in the Construction Industry that could require new training or up-skilling of the trades and semiskilled workforce. Prefabrication has been widely regarded as a sustainable construction method in terms of its impact on environmental protection. The main focus is on to reduce the cost & time of whole project by using PEB with Microsoft Project.

Indexed Terms: Time, Cost, MSP, Prefabricated Technology, Feasibility

I. INTRODUCTION

A prefabricated building, informally a prefab, is a building that is manufactured and constructed using prefabrication. It consists of factory-made components or units that are transported and assembled on-site to form the complete building. Buildings have been built in one place and reassembled in another throughout history. This was especially true for mobile activities, or for new settlements. Prefabricated construction methods are presenting a range of techniques to improve the building construction, quality and how to reduce the negative impact of building production on the environment. In this paper the replacement of nonstructural component with prefabrication element is proposed. The cost benefit analysis will be studied including prefabrication element in conventional building.

II. FUNDAMENTALS OF PREFABRICATION

2.1 Modularization:

Modularization is defined as the off-site construction of whole system prior to its transportation to the site of construction. The modules may often be required to be broken down into smaller sizes for ease of transportation. Modularization usually involves more than one trade.

2.2 Prefabrication:

This usually involves a single skill or trade and is generally defined as a production process, which normally takes place at a specialized factory where different materials are combined to form the component of an end-product. As long as the component is manufactured at a factory and is not a whole system, it is regarded as prefabricated.

2.3 Preassembly:

By definition, preassembly is the combination of various materials and prefabricated components at a separate facility before installation as a single unit. This installation is carried out similar to the process of modularization in which the manufactured components are assembled close to the site, followed by on-site installment. Commonly regarded as a combination of modularization and Prefabrication, preassembly usually involves works form various crafts and parts of different systems.

2.4 Industrialization:

This term refers to an inclusion of all three aforementioned categories of offsite construction. Industrialization is based on the concept of manufacturing and is defined as the procurement of

169

technology, equipment and facilities in order to increase productivity reduce manual labour and improve production qualities.

2.5 About Software:

It is primarily a visualization tool, which has improved the ability to exchange complex ideas among project participants. It has become easy to generate and reuse the information for construction projects. This is a 'CIEPM' (Computer Integrated Enterprise Project Management)concept which allows the meaningful extraction of project management data, information and knowledge from the participants beyond their imagination.

III. FACTORS AFFECTING THE COST OF BUILDING WORK- AN OVERVIEW

The issue of the cost of construction work is one that is rarely far from the minds of construction clients, design teams, constructors and, of course, quantity surveyors. The cost of constructing a building project is a primary concern for the vast majority of construction clients. Indeed one of the most common initial questions a client has is what is it going to cost me? Often followed closely by "can we do it any cheaper? "Providing answers to such questions is a key objective of quantity surveyors, whose task it is to predict the likely cost of building work and to manage the evolving project design to ensure that the client's approved budget is not exceeded.

- 1. The Client's Priorities
- 2. Quality Considerations
- 3. Cost Considerations
- 4. Time Considerations
- 5. The Choice of Architect
- 6. Choice of Materials
- 7. The Nature of the Site Location
- 8. Physical Site Conditions
- 9. Resource Availability
- 10. Environmental Considerations
- 11. Market Conditions

Sr. No.	Description	Quantity in cum	Cement in bag	sand in brass	Aggregate in brass	
Ι	PCC (M10) 1:03:06	18	63	3	6	
II	Footing (M20) 1:1.5:3	122	996	18	37	
III.	Plinth beam	3.459	28	1	1	
IV.	Columns					
1	Footing to plinth column	230	1879	35	69	
2	Plinth to first column	67	555	10	20	
3	First to second column	67	555	10	20	
4	Second to third column	67 555		10	20	
5	Third to fourth column	67	555	10	20	
6	Fourth to fifth column	67	555	10	20	
7	Terrace to O.H.W.T.	2.1	18	1	1	
V.	Beam		I			
1	1sr	31	182	7	7	
2	2 nd	31	182	7	7	
3	3rd	31	182	7	7	
4	4rth	31	182	7	7	
5	5 th	31	182	7	7	

 Table 1: Detail Quantity Estimation of Conventional Building (from Case study)

© MAR 2019 | IRE Journals | Volume 2 Issue 9 | ISSN: 2456-8880

6	O.H.W.T	9	75	2	3
VI.	Slab				
1	1 st	54	442	8	16
2	2 nd	54	442	8	16
3	3 rd	54	442	8	16
4	4rth	54	442	8	16
5	5 th	54	442	8	16

Table 2: Material Summary Steel for Proposed Residential Building

Sr.	Description	Unit	6	8	10	12	16	20	25	Total
No.	Description	Omt	mm	mm	mm	mm	mm	mm	mm	Quantity
Ι	Footing	kg	-	-	2899.2	853.08	-	-	-	3752.34
II	Column quantity									
1	Footing to plinth level	Kg	-	-	2110.5	67.85	-	-	-	2178.35
2	Plinth to first column	Kg	-	31.06	102	221	977	-	-	1331.06
3	First to second column	Kg	-	31.06	102	221	977	-	-	1331.06
4	Second to third column	Kg	-	31.06	102	221	977	-	-	1331.06
5	Third to fourth	Kg	-	31.06	102	221	977	-	-	1331.06
6	Fourth to fifth column	Kg	-	31.06	102	221	977	-	-	1331.06
7	Terrace to O.H.W.T.	Kg	-	31.06	102	221	977	-	-	1331.0
III	Plinth beam	Kg	-	554.9	-	-	-	-	-	554.9
IV	Slab quantity									
1	1 st floor	Kg	79	126	40	-	-	-	-	245
2	2 nd floor	Kg	79	126	40	-	-	-	-	245
3	3 rd floor	Kg	79	126	40	-	-	-	-	245
4	4rth floor	Kg	79	126	40	-	-	-	-	245
5	5 th floor	Kg	79	126	40	-	-	-	-	245
6	O.H.W.T	Kg	-	-	-	-	-	-	-	
V	Beam Quantity		I.	I		L				
1	1 st floor	Kg	797.1	1503	40.15	-	-	-	-	2340.3
2	2 nd floor	Kg	-	-	-	-	-	-	-	-
3	3 rd floor	Kg	-	-	-	-	-	-	-	-
4	4rth floor	Kg	-	-	-	-	-	-	-	-
5	Terrace floor	Kg	-	-	-	-	-	-	-	-
VI	Staircase quantity	Kg	-	838.31	-	-	-	-	-	838.3
VII	Lift wall		I	1		I	1	1		
1	up to plinth level	Kg	-	244.02	113.09	121.86	-	-	-	478.8
2	Plinth level to fourth	Kg	-	1478.3	499.9	538.2	-	-	-	2516.5
	level									

P		5. d			GANTT CHART TOOLS	ShivSai - F	Project Professional (P	roduct Activation Fa	ilea	D													?	- e	×
_	TI E		IRCE REDORT DROIE		FORMAT					·													Sign i		. ~
	ice	TASK RESOL		CT VIEVV	FORMAT																		Jightin		~
N		Wed 10/7/09	Fri 10/30/09	ter	2nd Quarter	(Brd)	Quarter	4th Quarter			1151	Quart	er			i2nc	Quar	ter			3rd Qu	arter			
E		Start	1.10 gau		Lind Quarter	0 - L - L	l és else suièle alaéas	ten éle e éles elie			1.7	Quart				12110	Quui				514 Q4		Fini	sh	
È		Mon 10/12/09				Add	a tasks with date:	s to the timeline	e														Fri 8	/19/11	
													Det 1	1 '00				Oct	18 '00			0	ct 25	00	
		Mode -	Task Name	- Duration	✓ Start		- Finish	Predecessors -	1	v т	F	s	SIN	1, US	w	TIE	s	S	M T	W T	F	s s	M	TWIT	F
	1		4 SHIVSAL G+4	485 days	Mon 10	12/09	Fri 8/19/11						8				-	_				_	-		_
	2	-	Excavation	15 days	Mon 10/	12/09	Fri 10/30/09										_				_		_	-	
	3	-	Foundation	10 days	Mon 11/	2/09	Fri 11/13/09	2																	
	4	-	Murum Filling	4 days	Mon 11/	16/09	Thu 11/19/09	3																	
	5	-	Slab 1	35 days	Fri 11/20)/09	Thu 1/7/10	4																	
	6		Slab 2	35 days	Fri 1/8/1	.0	Thu 2/25/10	5																	
	7		Slab 3	35 days	Fri 2/26/	10	Thu 4/15/10	6																	
	8	-,	Slab 4	35 days	Fri 4/16/	10	Thu 6/3/10	7																	
	9		Slab 5	35 days	Fri 6/4/1	.0	Thu 7/22/10	8																	
н	10		Brickwork	60 days	Fri 7/23/	10	Thu 10/14/10	9																	
IAR	11	-,	Plaster	29 days	Fri 10/15	5/10	Wed 11/24/10	10																	
Ċ	12		Plumbing	20 days	Thu 11/2	25/10	Wed 12/22/10	11																	
E	13		Waterproof	15 days	Thu 12/2	23/10	Wed 1/12/11	12																	
GA	14		Tile work	35 days	Thu 1/13	3/11	Wed 3/2/11	13																	
	15		Electric work	25 days	Thu 3/3/	'11	Wed 4/6/11	14																	
	16	-,	Painting	33 days	Thu 4/7/	'11	Mon 5/23/11	15																	
	17		Lift	40 days	Thu 11/2	25/10	Wed 1/19/11	11																	
	18		Drainage	15 days	Thu 1/20)/11	Wed 2/9/11	17																	
	19		Compound wall	11 days	Thu 2/10)/11	Thu 2/24/11	18																	
	20		Water tank	15 days	Fri 2/25/	11	Thu 3/17/11	19																	
	21		Plinth finishing	15 days	Fri 3/18/	11	Thu 4/7/11	20																	
	22		Door window	18 days	Fri 4/8/1	.1	Tue 5/3/11	21																	
	23		Fabrication	58 days	Wed 5/4	/11	Fri 7/22/11	22																	
	24		Tab, Light	20 days	Mon 7/2	5/11	Fri 8/19/11	23																	Ŧ
	4							Þ																	•
RE	ADY	S NEW TASKS : A	UTO SCHEDULED																		II	1			+
6	2		6 🖸	()	PB															- (2	Ū,	al 🏟	2:13 P 6/21/2	M 019

IV. SCHEDULING OF CONVENTIONAL BUILDING BY USING MSP

V. COSTING OF CONVENTIONAL BUILDING BY USING MSP

P 9 F1L	E.	S → C ² → P TASK RESOURCE	REP	PORT PRO	G/	NTT CHART TOOLS ShivSai	- Project Profes	sional (Product /	Activation Failed	D			7 – Sign in 📕		××
MELINE	8/30/	Start		1st Qu	Tue 1/26/10 arter	nd Quarter	ard Quarter dd tasks wit	l ^{4th Q} h dates to th	uarter ie timeline	1st Quarter	2nd Quarter	3rd Quarter	Einish		
		180 10/12/09											FIL 8/19/1	11	
		Task Name	÷	Fixed Cost 🗸	Fixed Cost Accrual	Total Cost 👻	Baseline 👻	Variance 🚽	Actual 👻	Sep '09 Oct '09 30 6 13 20 27 4 1	Nov '09	Dec '09 22 29 6 13 2	Jan ': 0 27 3	10 10 1	7
	1	A SHIVSAL G+4		হ 0.00	Prorate	d ₹ 19,599,840.00	হ 0.00	19,599,840.00	ক 0.00	i					_
	2	Excavation		रु 0.00	Prorate	t 🔨 🕹 🕹	で 0.00	रु 0.00	रु 0.00		7				
	3	Foundation		₹ 0.00	Prorate	ৰ হ ০.০০	₹ 0.00	হ 0.00	रु 0.00						
	4	Murum Filling		₹ 0.00	Prorate	র হ ০.০০	₹ 0.00	रु 0.00	रु 0.00						
	5	Slab 1		ক 0.00	Prorate	ব হ ০.০০	ক ০.০০	ক ০.০০	ক ০.০০		i i i i i i i i i i i i i i i i i i i				
	6	Slab 2		ক 0.00	Prorate	d रु.000	天 0.00	天 0.00	रु 0.00					(
	7	Slab 3		ক 0.00	Prorate	t 🔨 🕹 🕹 🕹	₹ 0.00	₹ 0.00	रु 0.00						
	8	Slab 4		रु 0.00	Prorate	t 0.00 क	天 0.00	ক 0.00	रु 0.00						
	9	Slab 5		₹ 0.00	Prorate	す 0.00 v	₹ 0.00	₹ 0.00	枣 0.00						
E.	10	Brickwork		₹ 0.00	Prorate	t 00.00 क	হ ০.০০	रु 0.00	হ ০.০০						
AR.	11	Plaster		₹ 0.00	Prorate	す 0.00 v	₹ 0.00	₹ 0.00	ক ০.০০						
0	12	Plumbing		₹ 0.00	Prorate	t र 0.00	হ ০.০০	रु 0.00	रु 0.00						
E.	13	Waterproof		₹ 0.00	Prorate	d ক 0.00	₹ 0.00	₹ 0.00	ক 0.00						
B	14	Tile work		रु 0.00	Prorate	t 0.00 क	天 0.00	रू 0.00	रु 0.00						
	15	Electric work		₹ 0.00	Prorate	t 0.00 रू	रु 0.00	₹ 0.00	रु 0.00						
	16	Painting		₹ 0.00	Prorate	t 0.00 क	रु 0.00	रु 0.00	रु 0.00						
	17	Lift		₹ 0.00	Prorate	す 0.00	रु 0.00	₹ 0.00	枣 0.00						
	18	Drainage		₹ 0.00	Prorate	t 0.00 क	₹ 0.00	হ 0.00	হ ০.০০						
	19	Compound wall		₹ 0.00	Prorate	す 0.00 v b	₹ 0.00	₹ 0.00	ক ০.০০						
	20	Water tank		₹ 0.00	Prorate	t 0.00 क	হ ০.০০	रु 0.00	रु 0.00						
	21	Plinth finishing		₹ 0.00	Prorate	t रु.00	₹ 0.00	₹ 0.00	₹ 0.00						
	22	Door window		₹ 0.00	Prorate	t হ 0.00	रु 0.00	रु 0.00	रु 0.00						
	23	Fabrication		रु 0.00	Prorate	t で 0.00	天 0.00	रु 0.00	रु 0.00						- L
	24	Tab, Light		₹ 0.00	Prorate	t र 0.00	₹ 0.00	रु 0.00	रु 0.00						
	•	_							Þ	4					œ١'
READ	Y	NEW TASKS : AUTO SCH	IEDUL	LED									L		1
		iii 💿 👔	-	10		PB						- 🖸 🖛 🗰 .	all (I) a	2:14 PN	

Concluder Remark for Conventional Building by using MSP:

From the above Scheduling Sheet (WBS) & Costing Sheet, Required time for Conventional Building is found 485 days having total required cost is found to be Rs. 19599840

P		ن ک	¢• ∓				GANTT CHAP	RT TOOLS SH	hivSai - PreFi -	Project Professio	nal (Pi	roduct Activation	Failed)				3		Ð ×
E	ILE	TASK	RESOU	IRCE REF	PORT PROJECT	VIEW	FORM	IAT									Sign	in 🏳 🗄	3 ×
Gar Cha	ntt Ta art • Usa	sk ge + 📑	Network D Calendar Other View Views	iagram ▼ ▼ vs ▼	Team Planner - Resource V	urce Usage 🔹 urce Sheet 👻 r Views 👻 /iews	A Z Sort Ou	tline Tables	 ✓ Highlight: ▼ Filter: 	[No Highlight] ▼ [No Filter] ▼ [No Group] ▼	Tin [7]	Days T	oom Entire Selected Project Tasks	Timeline Timeline Details Split View	e	New Window Window	Mac	ros	~
ш	Sun 9/1	L3/09			Fri 11/27/09														
Start I Ist Quarter 2nd Quarter 3rd Quarter 4th Quarter								uarter	1st Quarter		2nd Quar	er Einish							
TIME		Mor 10,	/12/09						Add tasks	with dates to	o the	e timeline					Fri 5/1	3/11	
		0	Task Mode 🗸	Task Name	•	Duration	•	Start	•	Finish	- I	Predecessors 👻	Resource Names 👻	Add New Column) 13 2	Oct '09 0 27 4 1:	1 18 25	Nov '09 1 8 1!	5 22
	1				G+4	415 days		Mon 10/12	2/09	Fri 5/13/11			Constructon Cost[2						_
	2			Exca	vation	15 days		Mon 10/12	/09	Fri 10/30/09							h		
	3			Foun	dation	10 days		Mon 11/2/	09	Fri 11/13/09	2						1	i n	
	4		- 5	Muru	ım Filling	4 days		Mon 11/16	/09	Thu 11/19/09	3							*	հ
	5		-	Slab	1	35 days		Fri 11/20/0	19	Thu 1/7/10	4								
	6			Slab	2	35 days		Fri 1/8/10		Thu 2/25/10	5								
	7			Slab	3	35 days		Fri 2/26/10)	Thu 4/15/10	6								
Ľ	8			Slab	4	35 days		Fri 4/16/10)	Thu 6/3/10	7								
HAF	9		-4	Slab	5	35 days		Fri 6/4/10		Thu 7/22/10	8								
TC	10		-,	Prefil	prication Walls	30 days		Fri 7/23/10)	Thu 9/2/10	9	l.							
LT N	11		÷	Plast	er	15 days		Fri 9/3/10		Thu 9/23/10	1	0							
ß	12		->	Plum	ibing	20 days		Fri 9/24/10		Thu 10/21/10	1	1							
	13			Wate	erproof	15 days		Fri 10/22/1	.0	Thu 11/11/10	1	2							
	14			Tile	vork	35 days		Fri 11/12/1	.0	Thu 12/30/10	1	3							
	15		->	Elect	ric work	25 days		Fri 12/31/1	.0	Thu 2/3/11	1	4							
	16		->	Paint	ting	33 days		Fri 2/4/11		Tue 3/22/11	1	5							
	17			Lift		40 days		Fri 9/24/10)	Thu 11/18/10	1	1							
	18			Drain	nage	15 days		Fri 11/19/1	.0	Thu 12/9/10	1	7							
	19		->	Com	pound wall	11 days		Fri 12/10/1	.0	Fri 12/24/10	1	8							
	20		->	Wate	er tank	15 days		Mon 12/27	/10	Fri 1/14/11	1	9							Ŧ
	4												1		4]			Þ
REA	ADY.	⇒ NEV	V TASKS : AL	UTO SCHEDUI										E		.	ŧ	· •	+
				6	۵.		PB									• Q 🖻	🔒 .at 🖣	·)) 1:14 F ·)) 7/17/2	PM 2019

VI. SCHEDULING OF PREFABRICATED BUILDING BY USING MSP

VII. COSTING OF PREFABRICATED BUILDING BY USING MSP

P.S FI		ちょ ごう キ TASK RESOURCE REPO	ORT	PROJECT VI	EW	GANTT CHART TO FORMAT	OLS ShivSai - PreFi -	Project Profe	essional (Product Ac	ctivation Failed))			? – Sign in	8 ×
Gar Cha	ntt T rt • Usa	Calendar × ask age × Colendar × age × Colendar × Task Views × Task Views	Team Planner +	Resource Usa	ige * et *	AJ Sort Outline	Tables Tables	[No Highlig [No Filter] [No Group]	nt] * Timescale: * [7] Days	Zoom	Entire Selected Project Tasks	Timeline Timeline Details Solit View	Vew Window	Macros	^
TIMELINE	Sun 9/	13/09 Sun 1: Start Mon 10/12/09	1/15/09	1st Quarter	1	2nd Q	uarter Add tas	l ^{3rd Quart} ks with da	er tes to the time	l ^{4th Quart}	er	1st Quarter	2nd Quarte	r Finish Fri 5/13/11	
		Task Name	↓ Fix	xed Cost 👻	Fixed	Cost Accrual 👻	Total Cost 🗸	Baseline 👻	Variance 👻	Actual 👻	Remaining 👻	Add New Column 👻) Oct ' 13 20 27 4	09 N 11 18 25 1	lov '09 ▲ 1 8
- I	1		_	হ 0.00		Prorated	रु 19,080,000.00	रु 0.00	₹ 19,080,000.00	হ 0.00	₹ 19,080,000.00)	Ī	8	<u> </u>
	2	Excavation		रु 0.00		Prorated	रु 0.00	₹ 0.00	रु 0.00	रु 0.00) रु 0.00)		h	
	3	Foundation		रु 0.00		Prorated	रु 0.00	天 0.00	天 0.00	रु 0.00	o.oo रु)		Ĩ	
	4	Murum Filling		रु 0.00		Prorated	रु 0.00	天 0.00	天 0.00	रु 0.00	o.oo ₹ 0.00)			
	5	Slab 1		रु 0.00		Prorated	रु 0.00	天 0.00	を 0.00	रु 0.00	o で 0.00)			
	6	Slab 2		रु 0.00		Prorated	衣 0.00	天 0.00	天 0.00	रु 0.00	、 で 0.00)			
	7	Slab 3		रु 0.00		Prorated	天 0.00	₹ 0.00	天 0.00	रु 0.00	0.00 ₹)			
Þ	8	Slab 4		रु 0.00		Prorated	天 0.00	₹ 0.00	天 0.00	रु 0.00	0.00 ₹)			
HAF	9	Slab 5		रु 0.00		Prorated	天 0.00	₹ 0.00	天 0.00	रु 0.00	0.00 ₹)			
Ĕ.	10	Prefibrication Walls		रु 0.00		Prorated	天 0.00	₹ 0.00	天 0.00	रु 0.00	0.00 ₹)			
NT.	11	Plaster		रु 0.00		Prorated	天 0.00	₹ 0.00	天 0.00	रु 0.00	0.00 ₹)			
3	12	Plumbing		रु 0.00		Prorated	天 0.00	₹ 0.00	天 0.00	ক 0.00	0.00 ₹)			
	13	Waterproof		रु 0.00		Prorated	रु 0.00	₹ 0.00	天 0.00	ক 0.00	0.00 ₹)			
	14	Tile work		रु 0.00		Prorated	रु 0.00	を 0.00	रु 0.00	₹ 0.00)			
	15	Electric work		रु 0.00		Prorated	रु 0.00	₹ 0.00	रु 0.00	₹ 0.00)			
	16	Painting		रु 0.00		Prorated	रु 0.00	枣 0.00	रु 0.00	₹ 0.00)			L
	17	Lift		रु 0.00		Prorated	रु 0.00	₹ 0.00	रु 0.00	₹ 0.00)			
	18	Drainage		रु 0.00		Prorated	रु 0.00	रु 0.00	रु 0.00	ক 0.00	o.oo रु	www.sarvovan.cr	om • 1m	4	¢ ×
	19	Compound wall		रु 0.00		Prorated	रु 0.00	ক 0.00	रु 0.00	ক 0.00	v ₹ 0.00				100
	20	Water tank		ক 0.00		Prorated	रु 0.00	₹ 0.00	衣 0.00	ক 0.00) रु 0.00	Released. Check he	re >>	4	- گ
REA	DY	-5 NEW TASKS : AUTO SCHEDULE	ED		_							- 	e = <u>-</u>		<u> </u>
6			1		W	P 3							- 🧕 🖻 🕼		PM

© MAR 2019 | IRE Journals | Volume 2 Issue 9 | ISSN: 2456-8880

Concluder Remark for Prefabricated Building by using MSP:

From the above Scheduling Sheet (WBS) & Costing Sheet, Required time for Conventional Building is found 415 days having total required cost is found to be Rs. 19080000

VIII. COMPARISON OF CONVENTIONAL CONSTRUCTION TO PREFABRICATION CONSTRUCTION

Type	Duration	Cost (B s)	Differ	rence
туре	Duration		Time (Days)	Cost (Rs)
Conventional Construction	485	19599840	70	510940
Prefabrication Construction	415	19080000	/0	517040

IX. CONCLUSION

From the above Comparison of Conventional Construction with Prefabrication Construction, it concludes that by using Prefabrication Techniques not only reduce the time required for construction but also minimize the cost of whole project. The survey found that 92% workers reported that the use of prefabrication Preassembly and precast would reduce hazards related to material handling on site and that the reduction of scaffolding through the use of prefabricated preassembly or precast components would lead to less falls on sites.

REFERENCES

- [1] Impact Of Prefabricated Technology & Equipment On The Profitability Using Primavera T.Subramani1, M. Muhammed Ansar2
- [2] Studies of the Prefabricated Housing Construction Market in Poland By Elzbieta Radziszewska -Zielina, Monika Glen.
- [3] A Study of Cost Comparison of Precast Concrete Vs Cast-In-Place Concrete VaishaliTurai1 & Ashish Waghmare2
- [4] Mohamed Nor Azhari Azman' The Perspective View Of Malaysian Industrialized Building System (Ibs) Under Ibs Precast Manufacturing
- [5] Omid Reza BAGHCHESARAEI' Behavior of Prefabricated Structures in Developed and Developing Countries'

- [6] Gerhard Girmscheid, Industrialization in Building Construction – Production Technology or Management Concept
- [7] Yuan, HP' Investigating waste reduction potential in the upstream processes of offshore prefabrication construction'
- [8] Hamza Khan' Study on the Trends & Usage of Prefabrication and Modularization: Increasing Productivity in the Construction Industry' ISSN 2278-3652 Volume 8, Number 2 (2017)
- [9] Tianying Li' Strategies for Implementation of Integrated Prefabrication Technology in Small Scale Isolated Buildings'
- [10] Hong Xue' Factors Affecting the Capital Cost of Prefabrication—A Case Study of China' Published: 24 August 2017