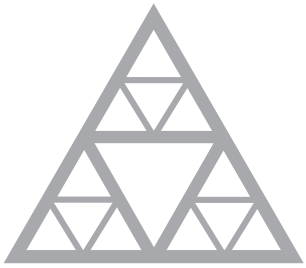
Modeling of bending-torsion couplings in active-bending structures. Application to the design of elastic gridshell.



École des Ponts

ParisTech

Thèse n. xxxxx
présenté le 01 décembre 2017
à l'Ecole des Ponts ParisTech
laboratoire Navier
Université Paris-Est

pour l'obtention du grade de Docteur ès Sciences
par

Lionel du Peloux

acceptée sur proposition du jury:

Prof Name Surname, président du jury
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Paris, Ecole des Ponts ParisTech, 2016

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C Review of built elastic gridshells

Appendix C. Review of built elastic gridshells

N	Year	Nickname	Type	City	Country	Ref.
1	1962	Experimental structure	Workshop	Berkeley	USA	[3]
2	1962	Exhibition pavilion	Pavilion	Essen	Germany	[3]
3	1967	German Pavilion	Pavilion	Montreal	Canada	[3]
4	1973	Seibu	Experiment	Tokyo	Japan	[2]
5	1974	Basket shell	Experiment	Amehabad	India	[3]
6	1974	Experimental structure	Experiment	London	England	[3]
7	1975	Mannheim Multihalle	Building	Mannheim	Germany	[3]
8	1973	Ferrocement gridshell	Building	Ahmedabad	India	[2]
9	1976	AA Bamboo Latice Shell	Workshop	London	England	[2]
10	1976	Test structure of a gridshell	Experiment	Stuttgart	Germany	[3]
11	1977	Small Pavilion	Workshop	Mexico City	Mexico	[2]
12	1977	Small Greenhouse	Workshop	Zitacuaro	Mexico	[2]
13	1977	Experimental structure	Workshop	Mexico City	Mexico	[2]
14	1977	Experimental structure	Workshop	Mexico City	Mexico	[2]
15	1995	Westminster Lodge	Building	Dorset	England	[4]
16	1998	Earth Center	Building	Doncaster	England	
17	2000	Japan Pavilion	Pavilion	Hannover	Germany	[13]
18	2002	Downland	Building	Downland	England	[12]
19	2002	Life Science Centre Trust	Building	Pishwanton	England	
20	2003	Woodland Center	Building	Filmwell	England	
21	2006	Savill	Building	Savill	England	[11]
22	2007	Chiddingstone Orangery	Roofing	Kent	England	
23	2007	ENPC	Experiment	Noisy-Champs	France	[8]
24	2011	Solidays	Pavilion	Paris	France	[1]
25	2012	Toledo	Workshop	Naples	Italy	[6]
26	2013	Créteil	Building	Créteil	France	[9]
27	2013	ZA	Workshop	Cluj	Romania	
28	2014	F2	Workshop	San Antonio	USA	
29	2014	Toledo 2.0	Workshop	Naples	Italy	[7]
30	2015	Booby	Experiment	Noisy-Champs	France	[5]
31	2016	JPO	Pavilion	Toulouse	France	
32	2016	FAV	Pavilion	Montpellier	France	
33	2016	CLC	Workshop	Noisy-Champs	France	
34	2016	Trondheim	Workshop	Trondheim	Norway	[10]

Table C.1 – Project review - general informations.

N	Material	Layer	Pitch m	Surface m^2	Span m	Section mm
1	steel	single	0.82	52	7.8	double Ø21.7
2	hemelock pine	single	0.48	198	16.8	60x40
3	hemelock pine	single	0.50	365	17.5	42x35 - 42x28
4	aluminium	single	0.50	72	8.5	20x20x2
5	bamboo	single	0.48	225	15.0	Ø25.4
6	yellow pine	single	0.45	82	6.0	14x19
7	hemelock pine	double	0.50	7400	60.0	50x50
8	steel	single	0.50	80	8.0	Ø19x1.2
9	bamboo	single	0.7	63	7.0	Ø25.4
10	hemelock pine	single	0.50	38	6.7	15x15
11	pine	single	0.50	62	6.0	16x24
12	wood	double	0.4	81	9.0	20x22
13	aluminium	single	0.50	58	7.3	double Ø8.0
14	steel	single		17	4.0	double Ø5.0
15	roundwood thinnings	double				Ø100.0
16	oak	single	0.4	36	6.0	32x15
17	cardboard	single	1.0	2500	35.0	Ø120x22
18	oak	double	1.0 - 0.5	710	16.0	50x35
19	larch	single	0.6	80	10.0	35x25
20	chestnut	single	0.6	300	12.0	75x25
21	larch	double	1.0	2000	24.0	80x50
22	sweet chestnut	double	1.0	50	5.0	40x30
23	GFRP	single	1.0	170	13.0	Ø41.7x3.5
24	GFRP	single	1.0	280	15.0	Ø41.7x3.5
25	wood	double	0.50	75	6.5	
26	GFRP	single	1.0	350	17.5	Ø41.7x3.5
27	larch	double	0.7	234	13.0	70x20
28	wood	double		144	12.0	
29	larch	double	0.50	100	10.0	50x20
30	GFRP	single	0.25	10	3.4	Ø10
31	pine	double	0.6	50	7.0	48x12
32	pine	double	0.6	50	7.0	48x12
33	pine	double	0.6	50	7.0	48x12
34	spruce	double	0.50	100	10.0	48x23

Table C.2 – Project review - key numbers.

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