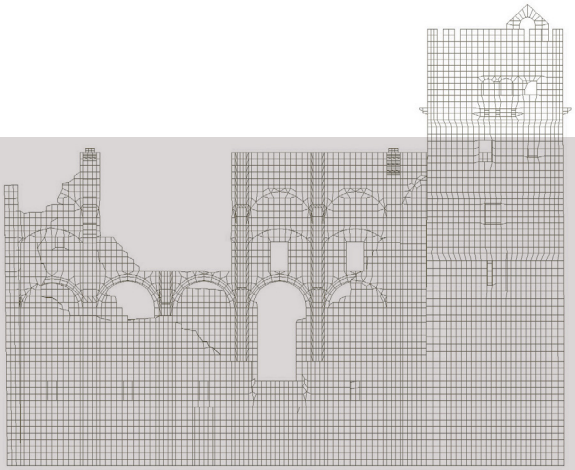
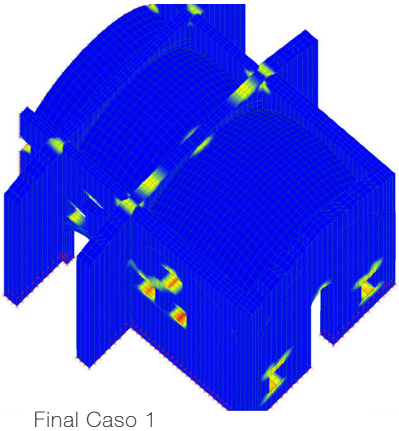


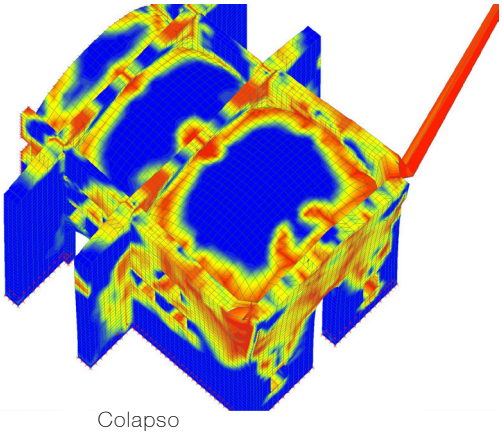
anexo b. índice de daño

01	bóvedas sobre muros	b5
.01	bóveda baída de envolvente esférica	b7
.02	bóveda de cañón de medio punto	b15
.03	bóveda de cañón de medio punto con lunetos	b23
.04	bóveda baída estrellada, nervaturas de ladrillo	b31
02	bóvedas sobre apoyos rígidos	b39
.01	bóveda baída de envolvente esférica	b41
.02	bóveda de cañón de medio punto	b49
.03	bóveda de cañón de medio punto con lunetos	b57
.04	bóveda baída estrellada, nervaturas de ladrillo	b65
.05	bóveda baída estrellada, nervaturas de piedra	b73
.06	bóveda de crucería, nervaturas de piedra, calota con pliegues	b81

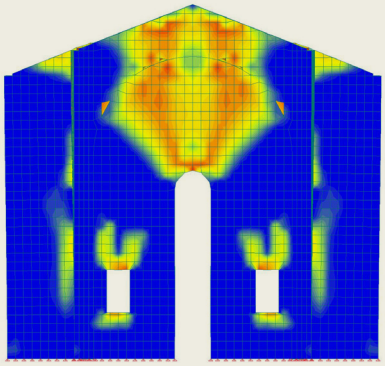
bóvedas sobre muros

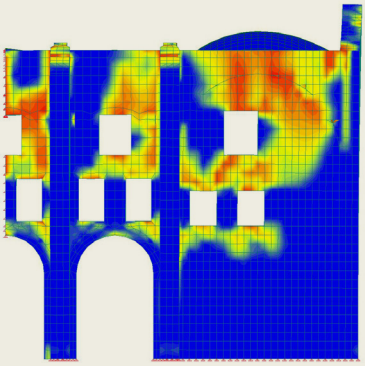


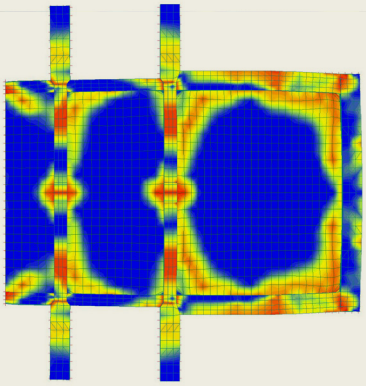
Final Caso 1



Colapso







Caso 2. Carga máxima

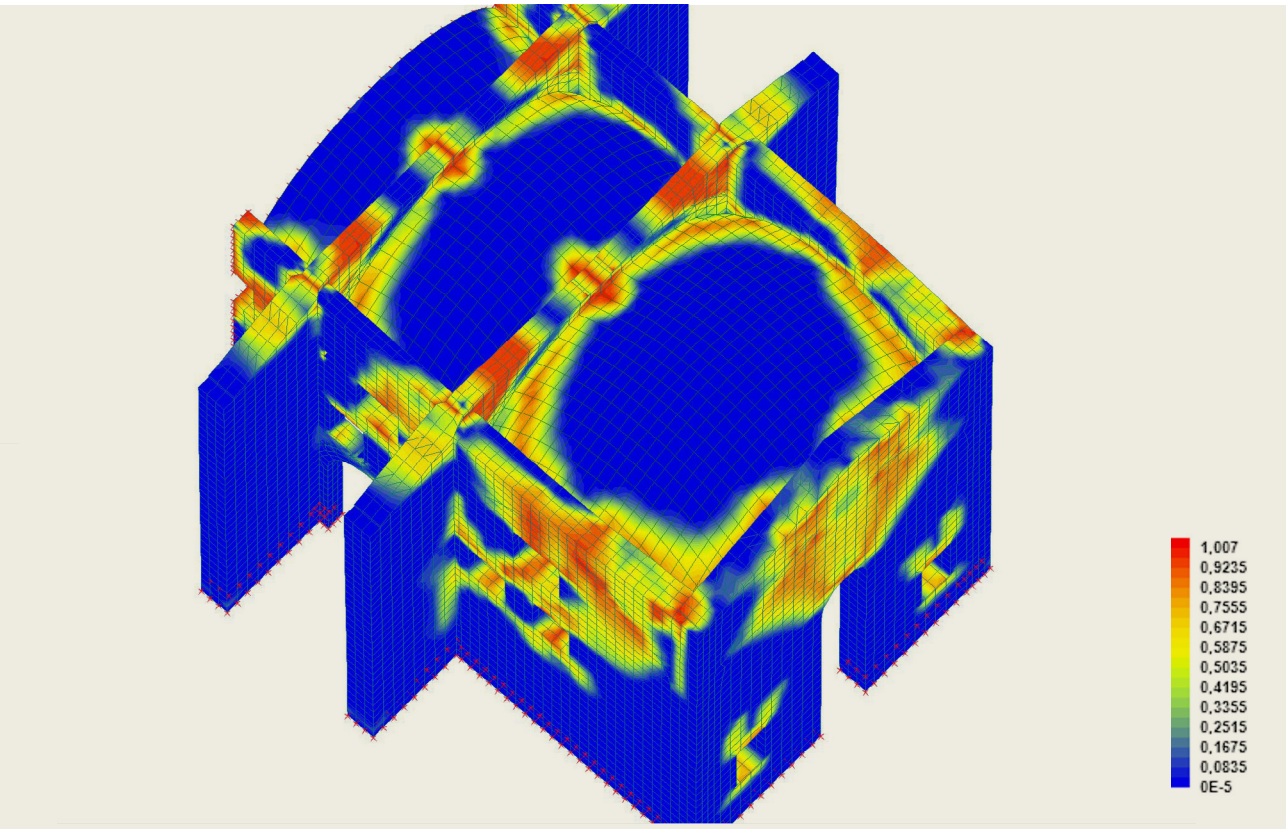
bóveda baída de envolvente esférica

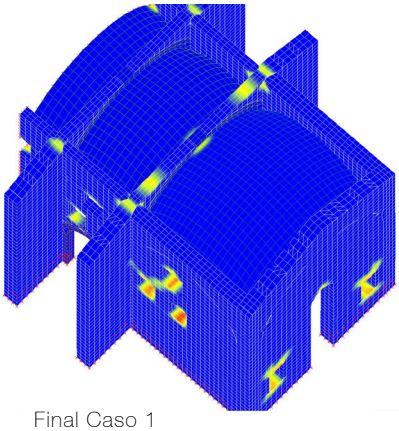
sin relleno de senos ni rigidizadores

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

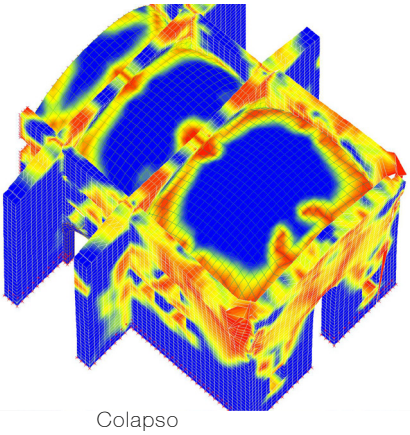
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
B_01	**6**	**1,1879**	**18**	**0,2921**	**38**	**0,176**	**14,605**	**1,00**
B_02	6	1,1879	18	0,2877	38	0,1521	14,385	0,98
B_03	6	1,1884	20	0,2907	43	0,1757	14,535	1,00
B_04	6	0,1868	19	0,3125	41	NeuN	15,625	1,07





Final Caso 1



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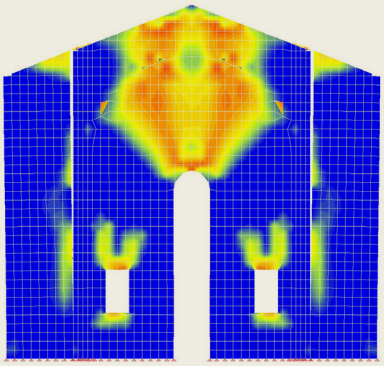
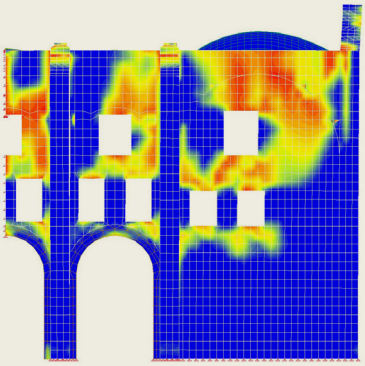
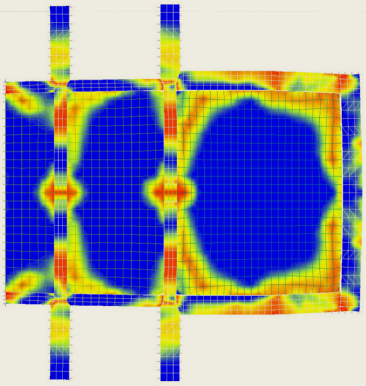






Caso 2. Carga máxima

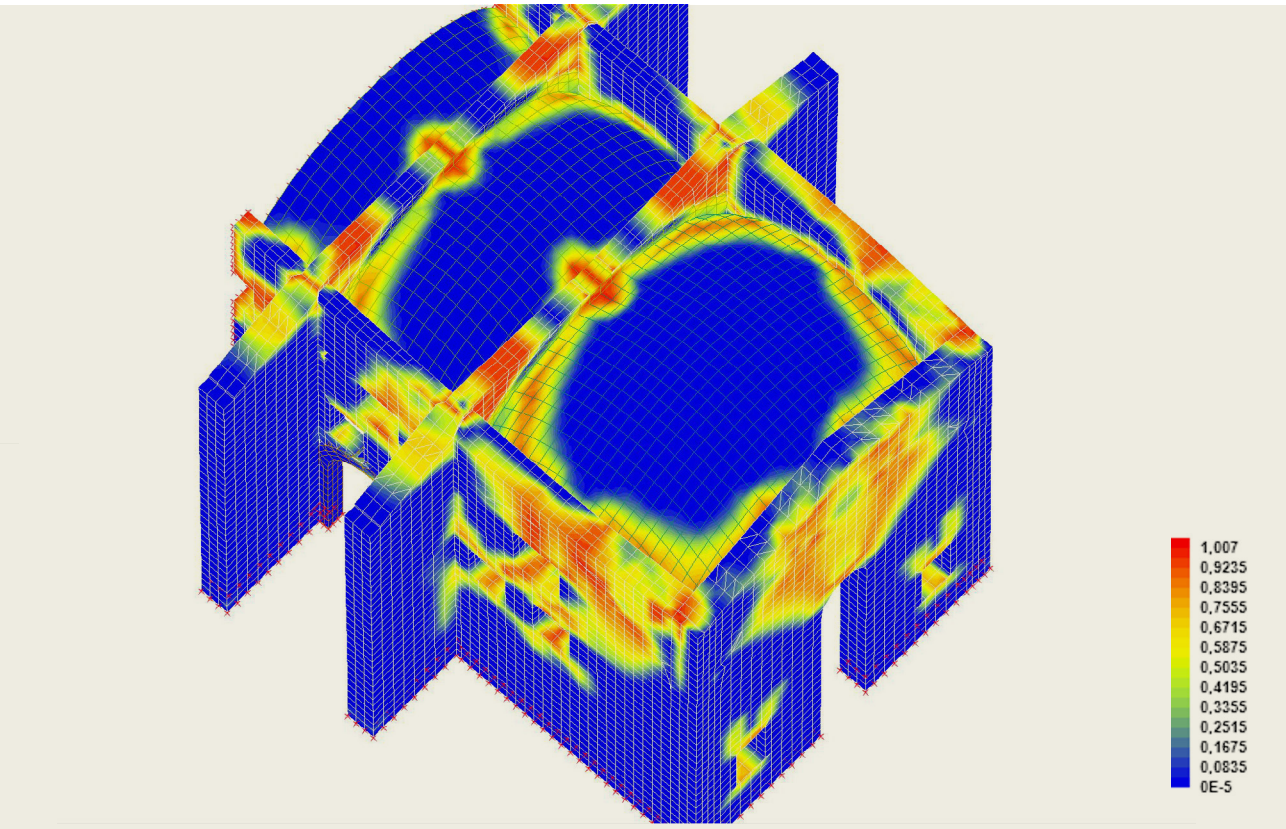
bóveda baída de envolvente esférica

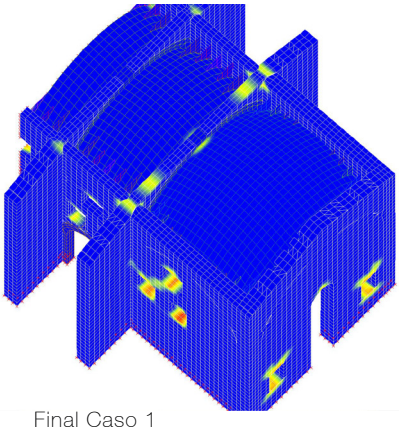
relleno de senos hasta 1/3 de h

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

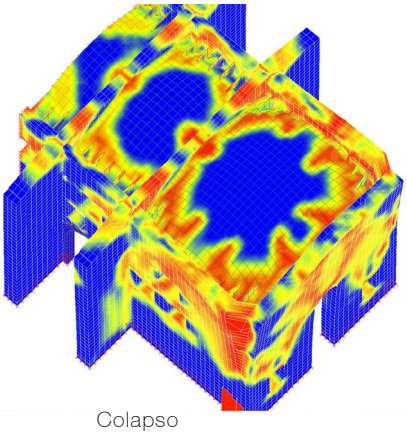
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
B_01	6	1,1879	18	0,2921	38	0,176	14,605	1,00
B_02	**6**	**1,1879**	**18**	**0,2877**	**38**	**0,1521**	**14,385**	**0,98**
B_03	6	1,1884	20	0,2907	43	0,1757	14,535	1,00
B_04	6	0,1868	19	0,3125	41	NeuN	15,625	1,07





Final Caso 1



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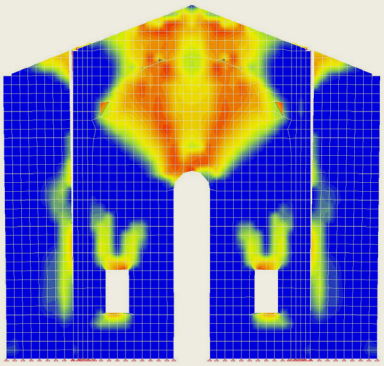
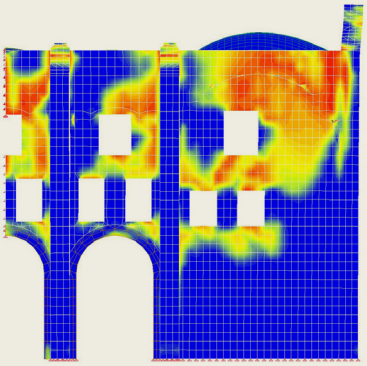
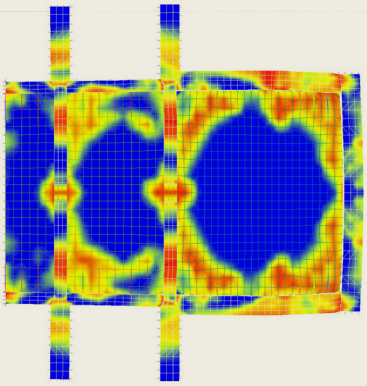






Caso 2. Carga máxima

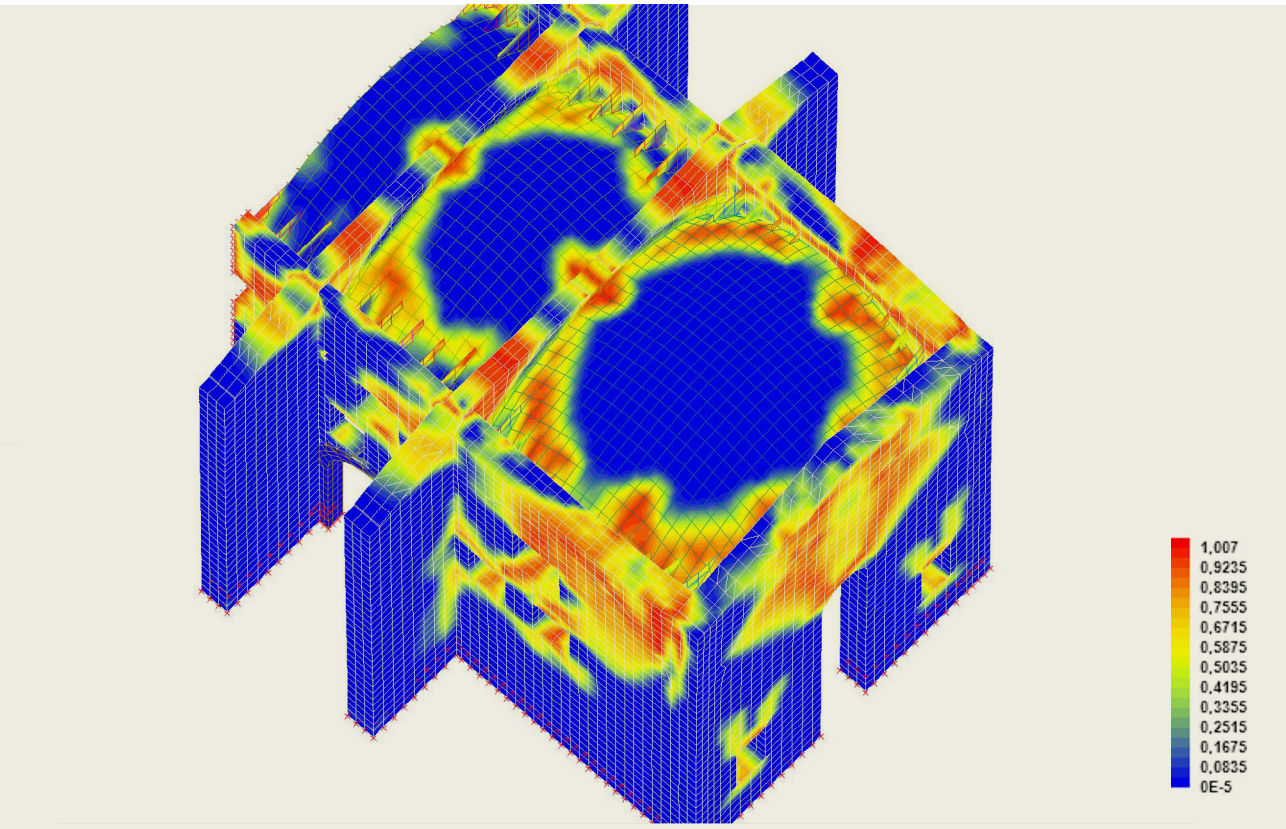
bóveda baída de envolvente esférica

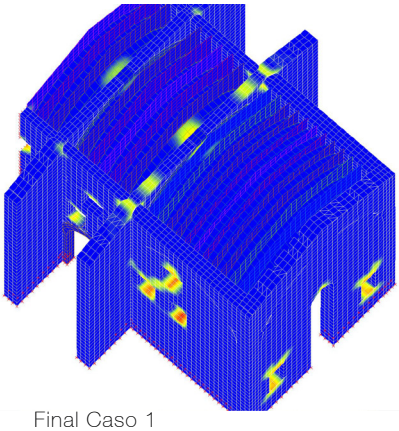
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

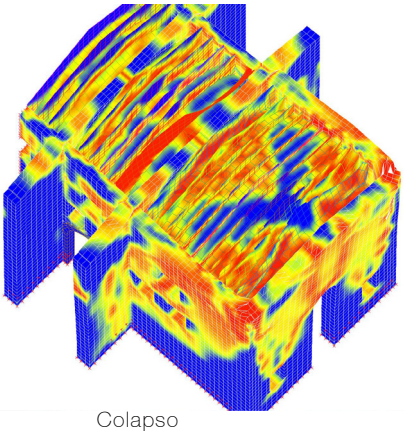
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
B_01	6	1,1879	18	0,2921	38	0,176	14,605	1,00
B_02	6	1,1879	18	0,2877	38	0,1521	14,385	0,98
B_03	**6**	**1,1884**	**20**	**0,2907**	**43**	**0,1757**	**14,535**	**1,00**
B_04	6	0,1868	19	0,3125	41	NeuN	15,625	1,07





Final Caso 1



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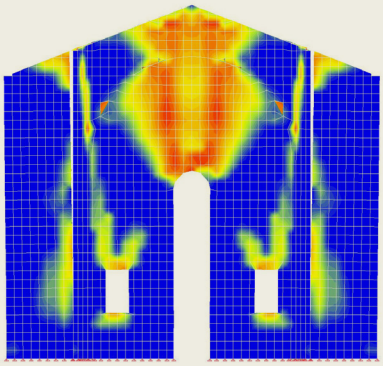
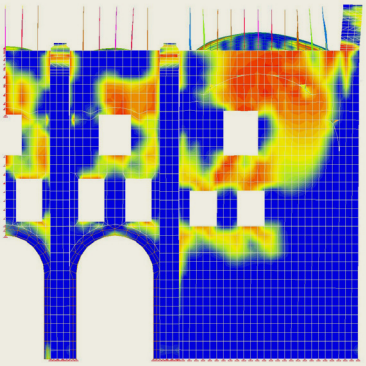
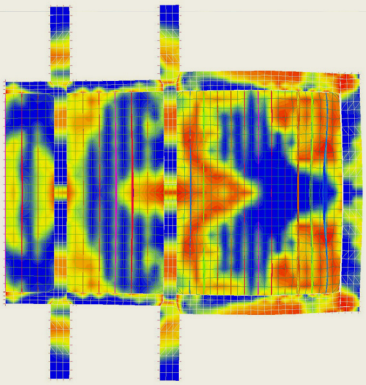






Caso 2. Carga máxima

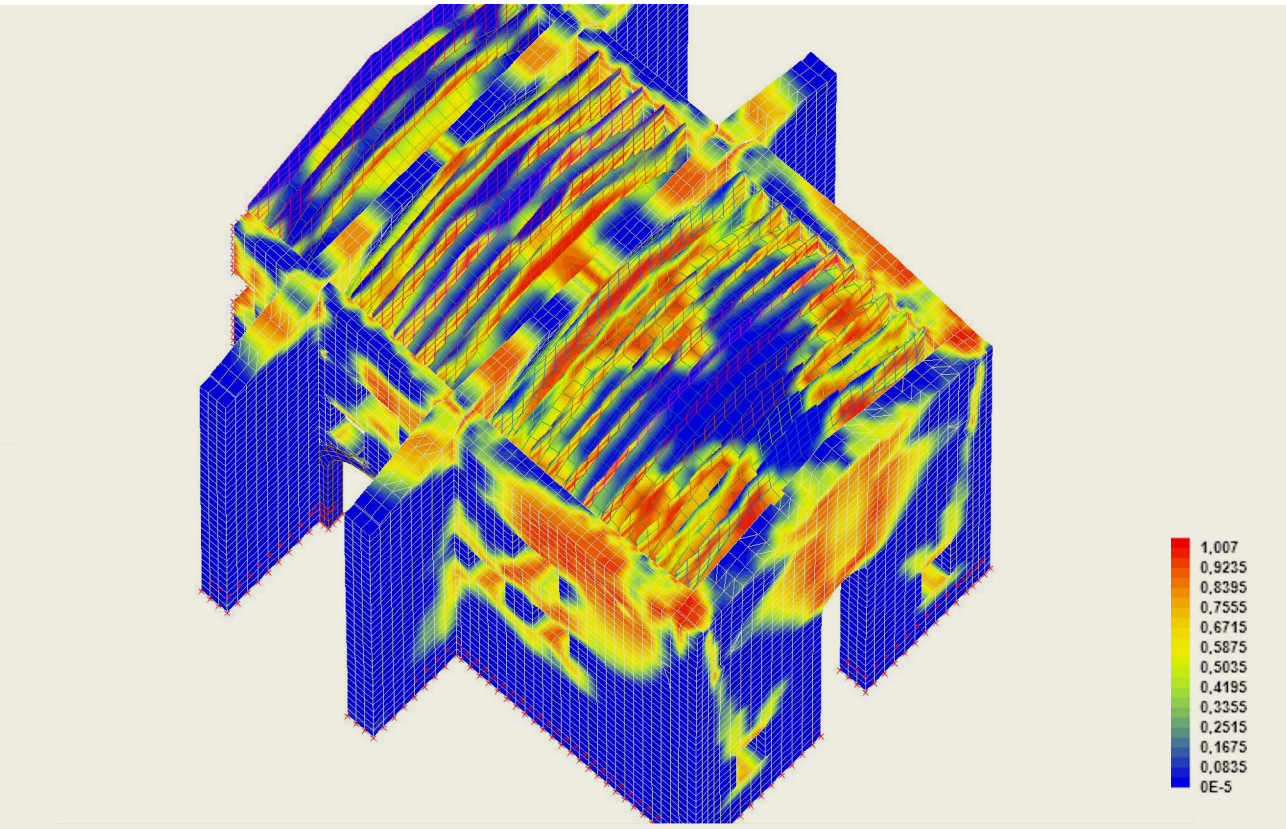
bóveda baída de envolvente esférica

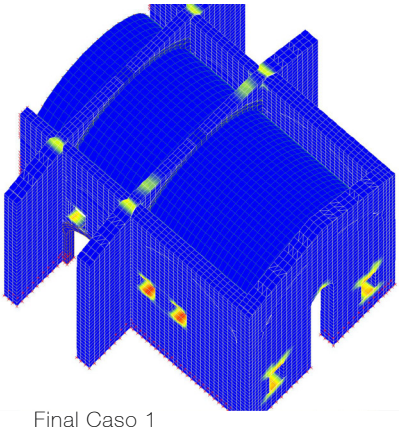
relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

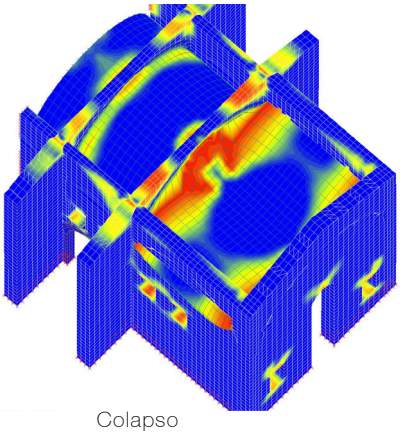
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
B_01	6	1,1879	18	0,2921	38	0,176	14,605	1,00
B_02	6	1,1879	18	0,2877	38	0,1521	14,385	0,98
B_03	6	1,1884	20	0,2907	43	0,1757	14,535	1,00
B_04	**6**	**0,1868**	**19**	**0,3125**	**41**	**NeuN**	**15,625**	**1,07**





Final Caso 1



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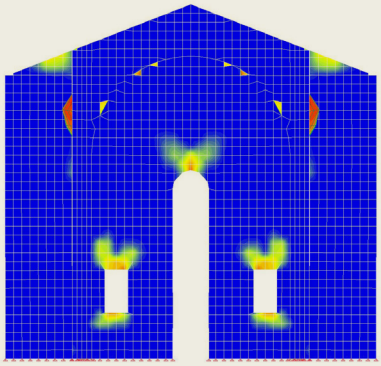
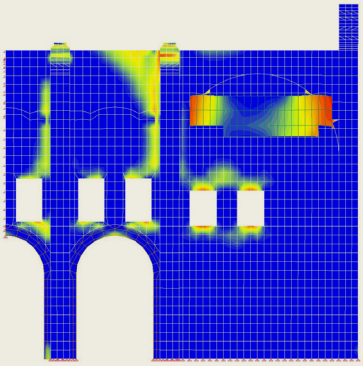
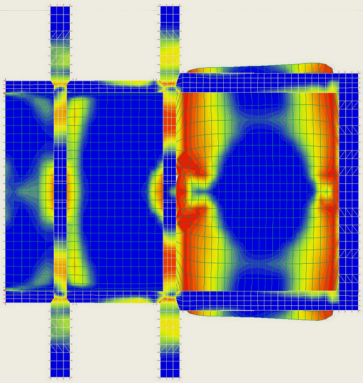






Caso 2. Carga máxima

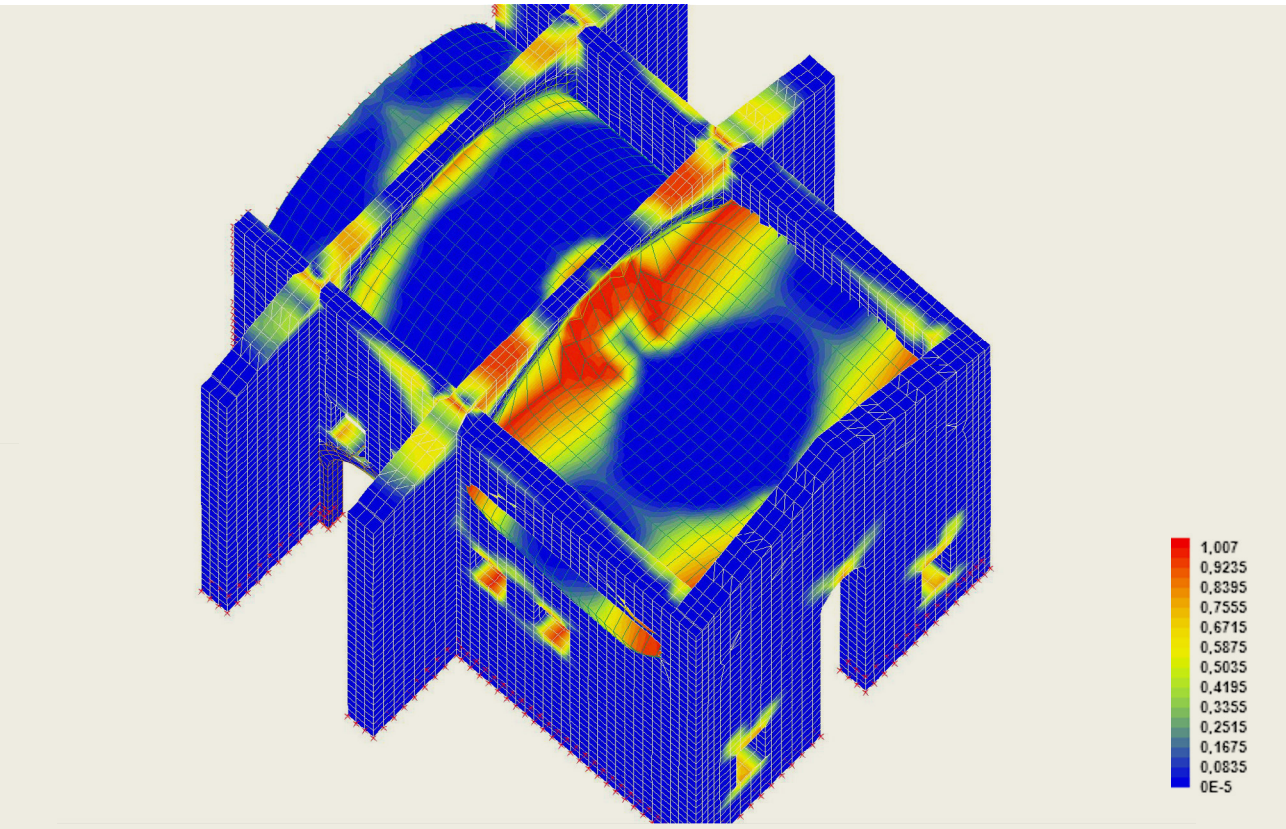
bóveda de cañón de medio punto

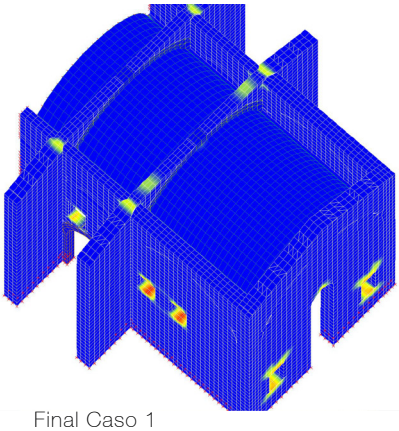
sin relleno de senos ni rigidizadores

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

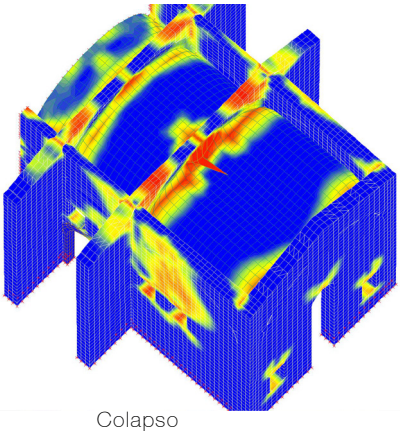
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
C_01	6	1,1904	59	0,097	60	0,0968	4,85	0,33
C_02	6	1,1906	33	0,2208	34	0,2196	11,04	0,76
C_03	6	1,1908	19	0,3013	60	0,1728	15,065	1,03
C_04	6	0,1900	25	0,4665	32		23,325	1,60

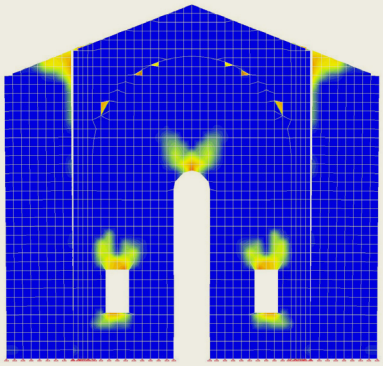


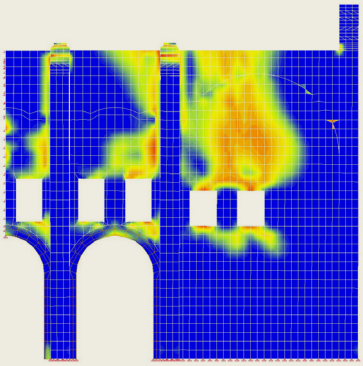


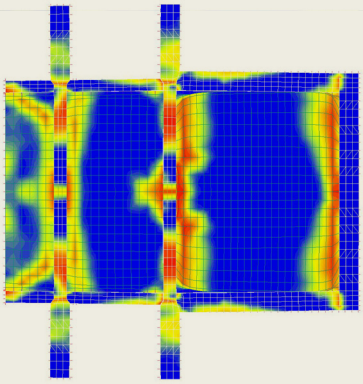
Final Caso 1



Colapso







Caso 2. Carga máxima

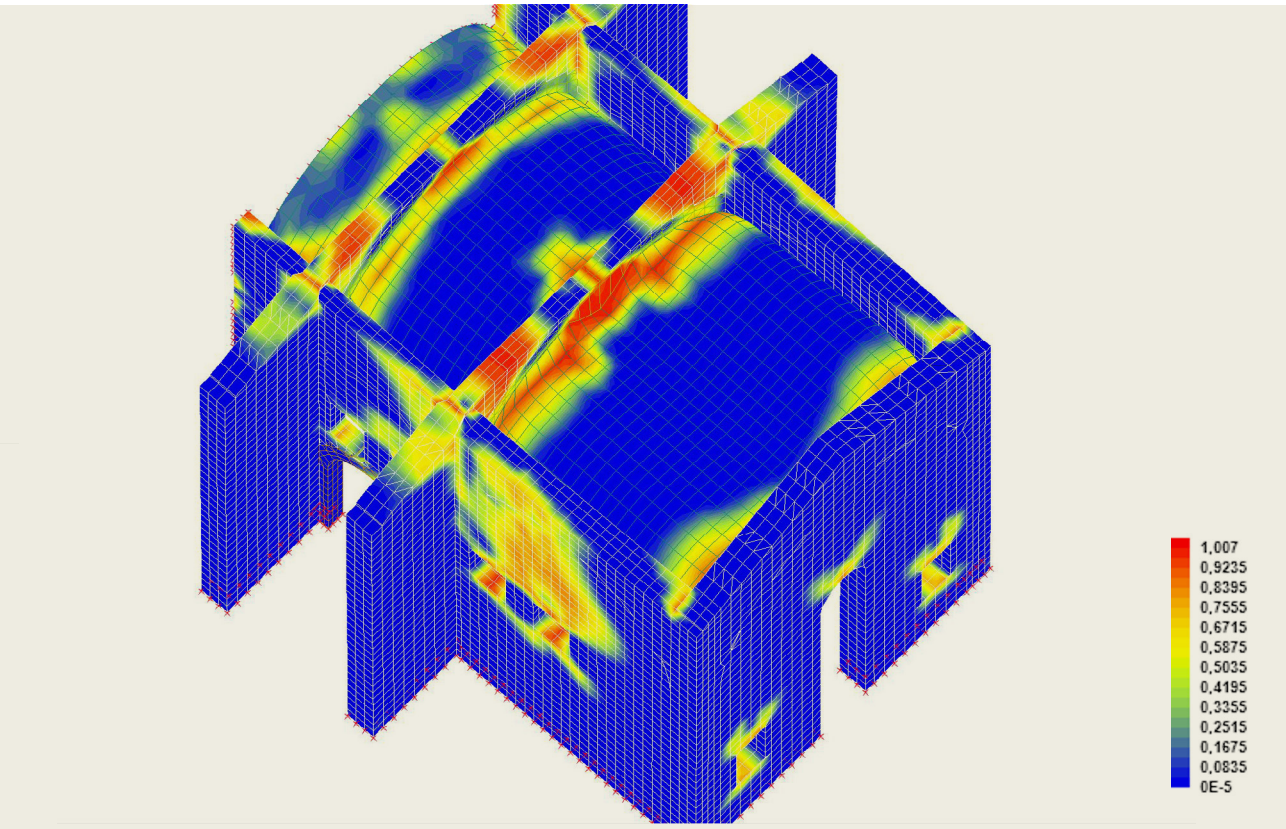
bóveda de cañón de medio punto

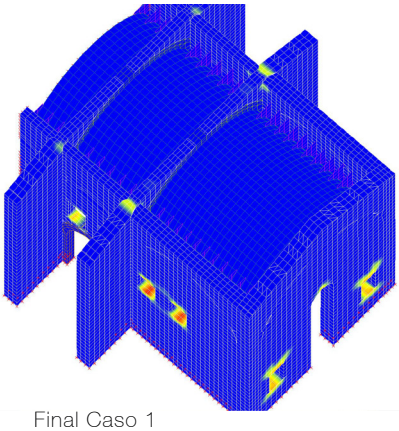
relleno de senos hasta 1/3 de h

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

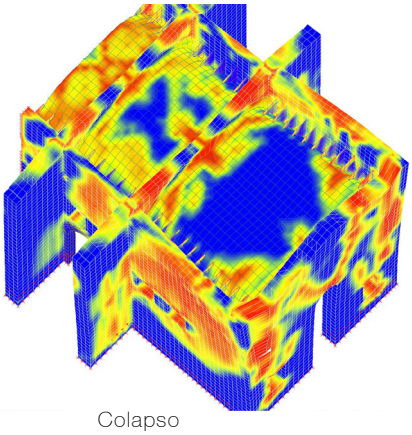
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
C_01	6	1,1904	59	0,097	60	0,0968	4,85	0,33
C_02	**6**	**1,1906**	**33**	**0,2208**	**34**	**0,2196**	**11,04**	**0,76**
C_03	6	1,1908	19	0,3013	60	0,1728	15,065	1,03
C_04	6	0,1900	25	0,4665	32		23,325	1,60

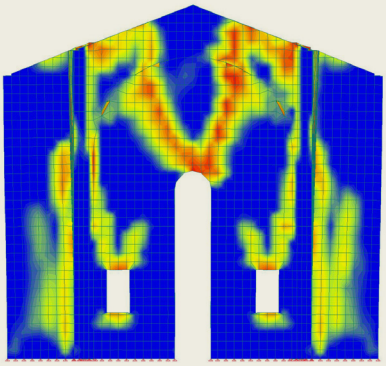


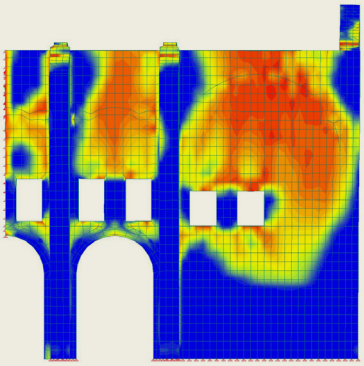


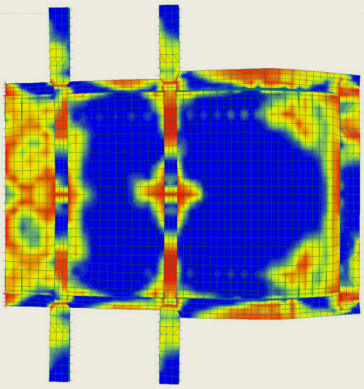
Final Caso 1



Colapso







Caso 2. Carga máxima

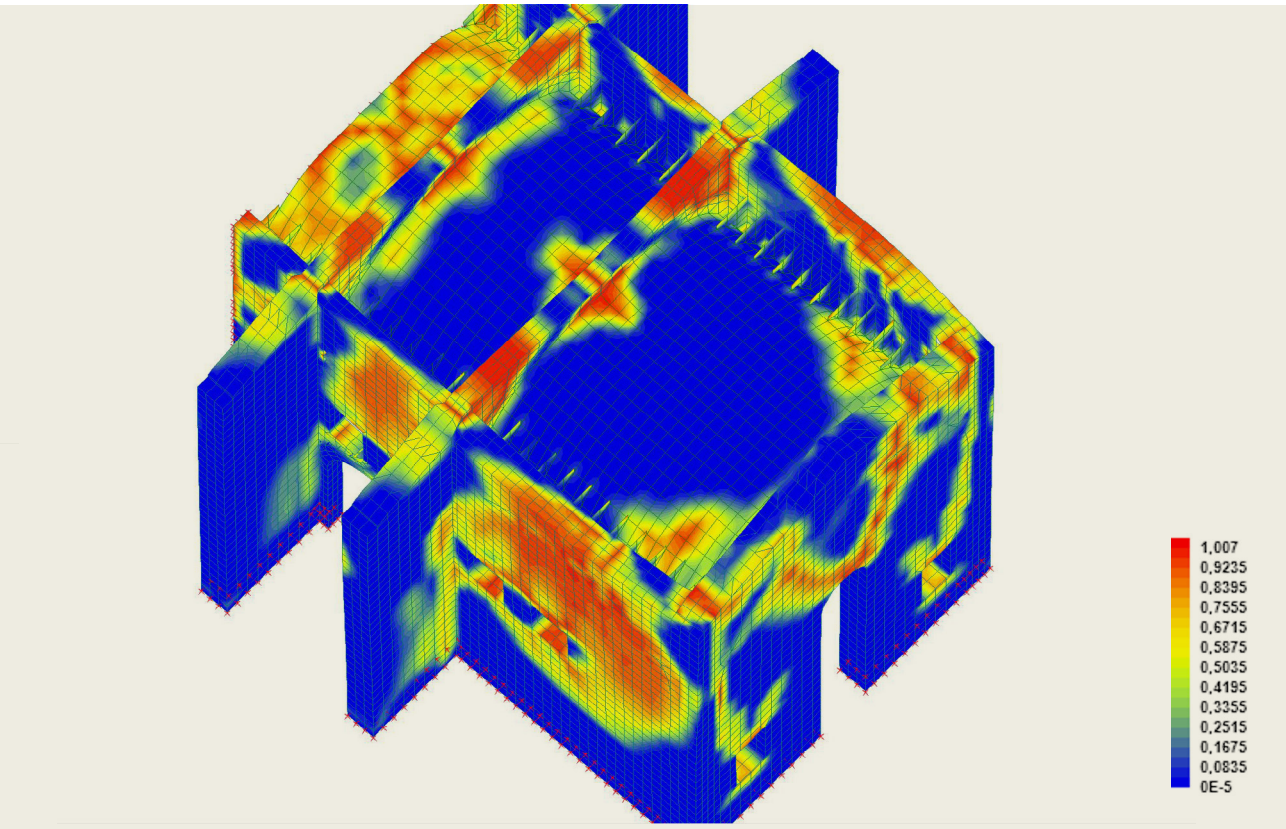
bóveda de cañón de medio punto

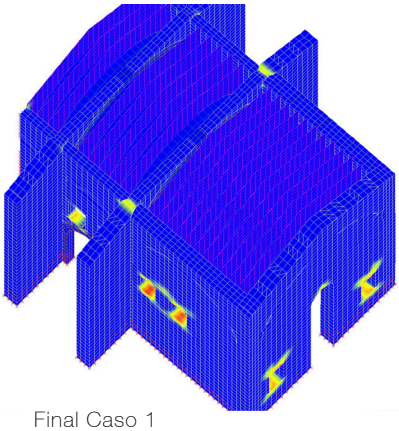
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

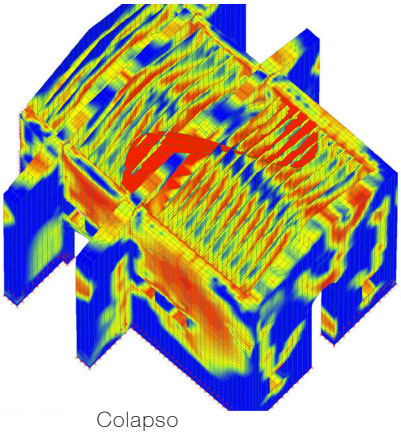
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
C_01	6	1,1904	59	0,097	60	0,0968	4,85	0,33
C_02	6	1,1906	33	0,2208	34	0,2196	11,04	0,76
C_03	**6**	**1,1908**	**19**	**0,3013**	**60**	**0,1728**	**15,065**	**1,03**
C_04	6	0,1900	25	0,4665	32		23,325	1,60





Final Caso 1



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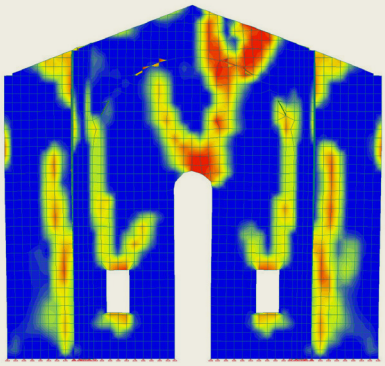
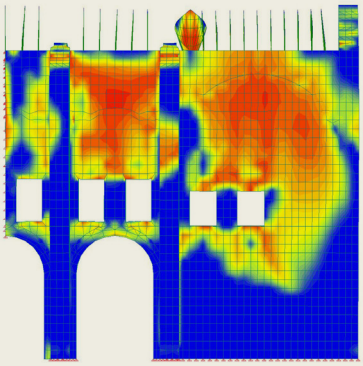
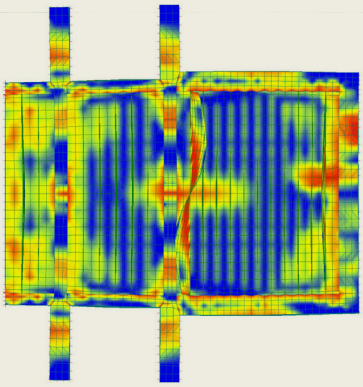






Caso 2. Carga máxima

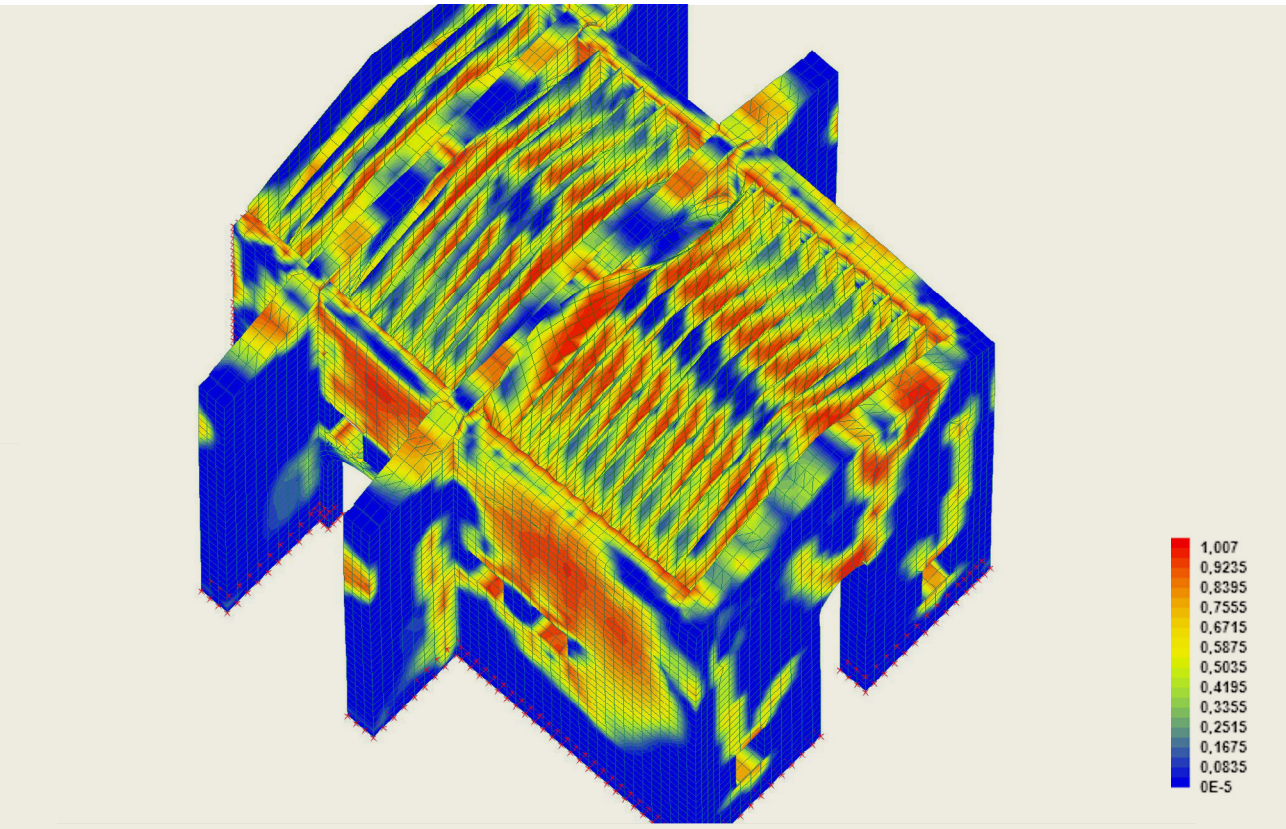
bóveda de cañón de medio punto

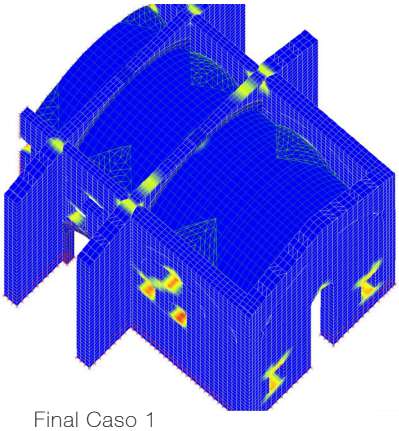
relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

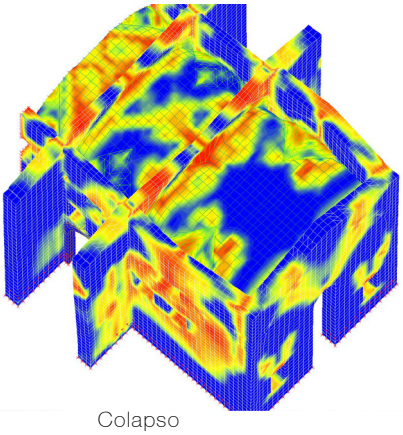
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
C_01	6	1,1904	59	0,097	60	0,0968	4,85	0,33
C_02	6	1,1906	33	0,2208	34	0,2196	11,04	0,76
C_03	6	1,1908	19	0,3013	60	0,1728	15,065	1,03
C_04	**6**	**0,1900**	**25**	**0,4665**	**32**		**23,325**	**1,60**





Final Caso 1



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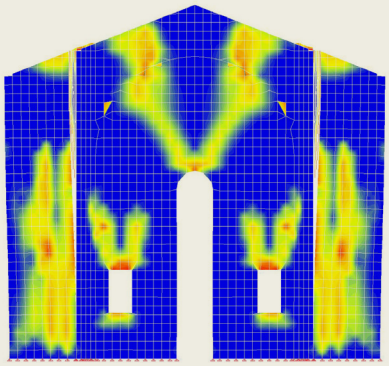
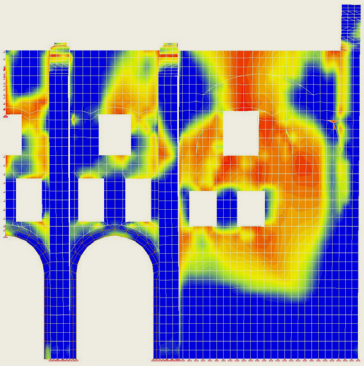
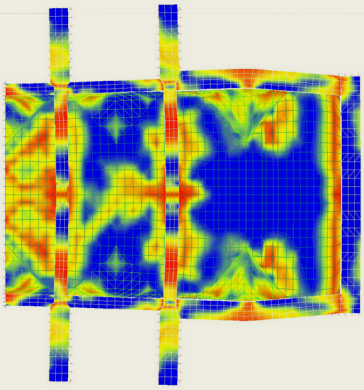






Caso 2. Carga máxima

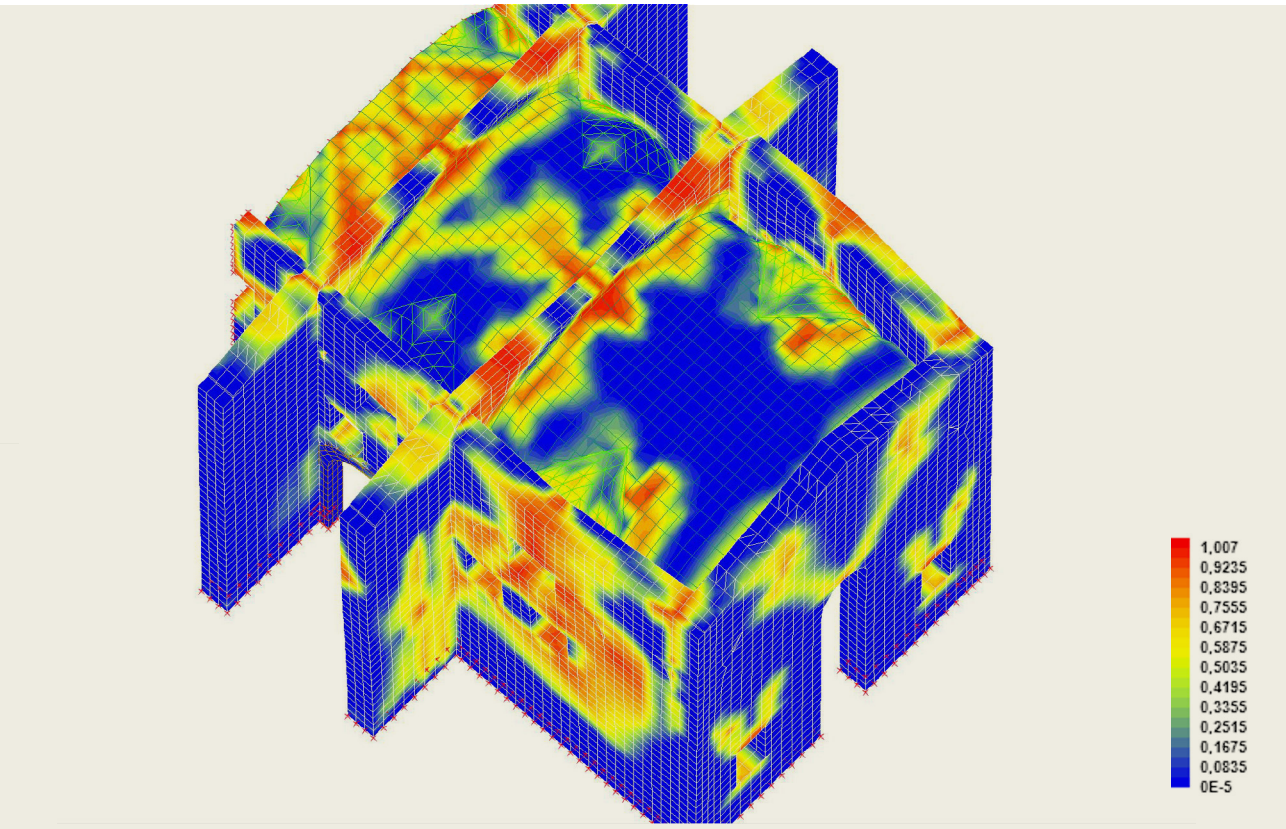
bóveda de cañón de medio punto con lunetos

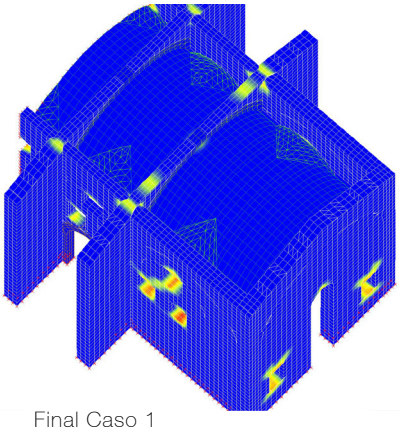
sin relleno de senos ni rigidizadores

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

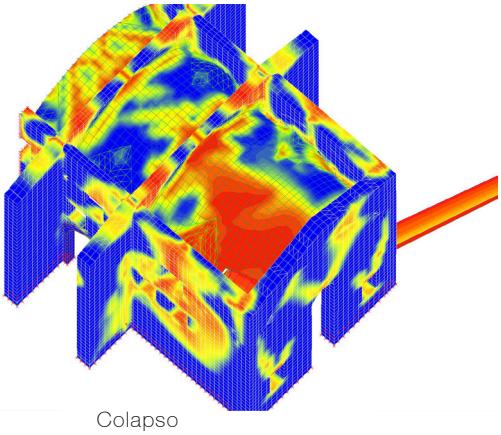
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
CL_01	**6**	**1,1879**	**25**	**0,232**	**42**	**-0,1756**	**11,6**	**0,79**
CL_02	6	1,1879	19	0,2537	26	-0,0409	12,685	0,87
CL_03	6	1,1879	20	0,3153	44	0,095	15,765	1,08
CL_04	6	1,1847	21	0,4601	26	NeuN	23,005	1,58





Final Caso 1



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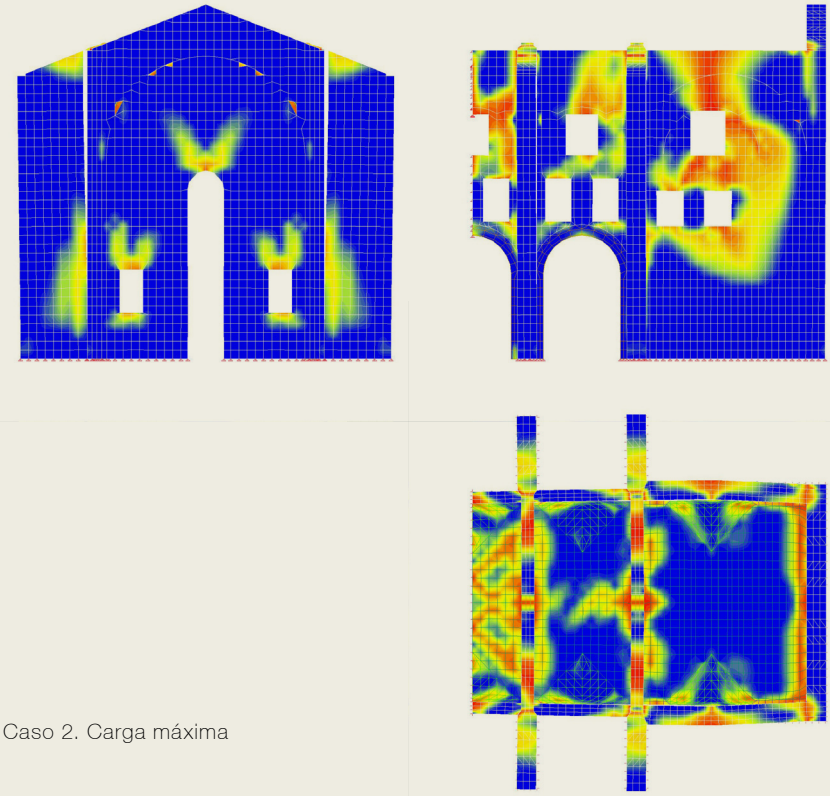


Caso 2. Carga máxima

bóveda de cañón de medio punto con lunetos

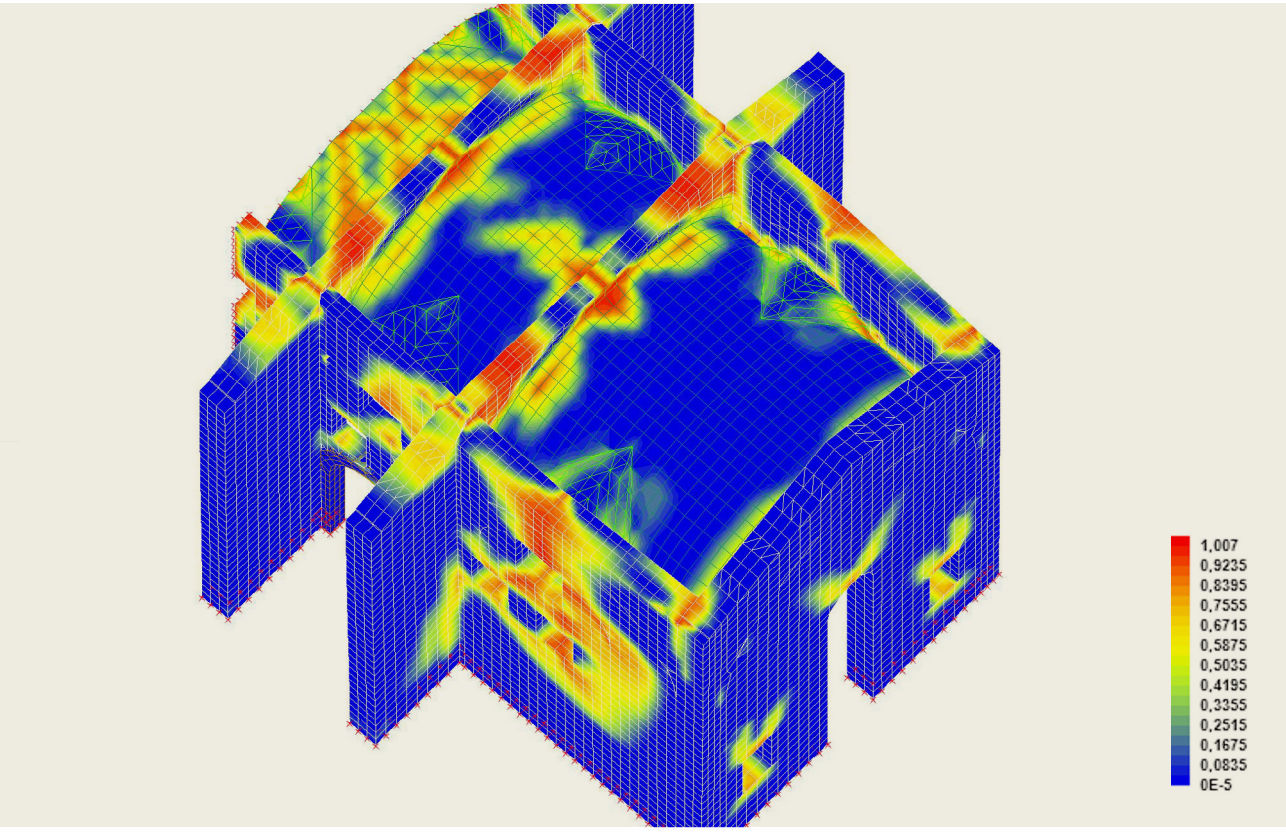
relleno de senos hasta 1/3 de h

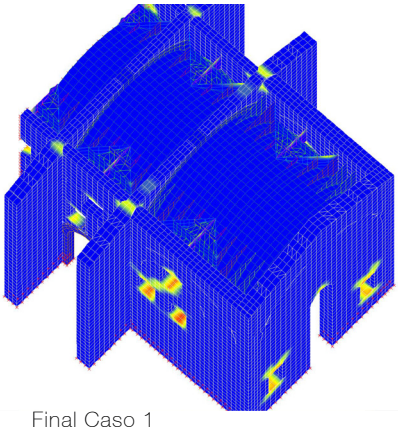
CL_02

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

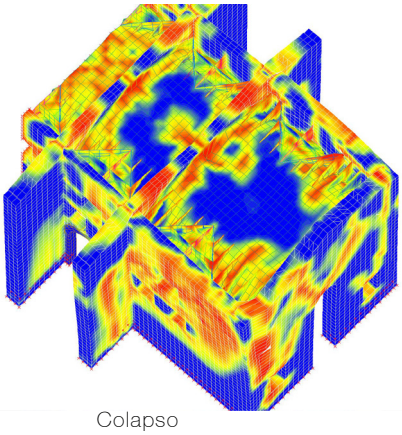
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
CL_01	6	1,1879	25	0,232	42	-0,1756	11,6	0,79
CL_02	**6**	**1,1879**	**19**	**0,2537**	**26**	**-0,0409**	**12,685**	**0,87**
CL_03	6	1,1879	20	0,3153	44	0,095	15,765	1,08
CL_04	6	1,1847	21	0,4601	26	NeuN	23,005	1,58





Final Caso 1



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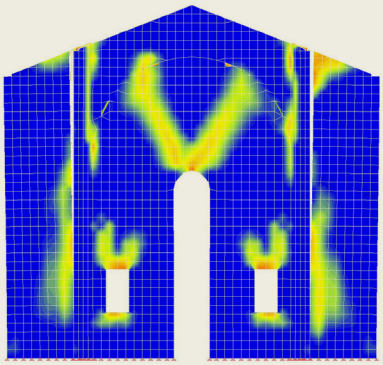
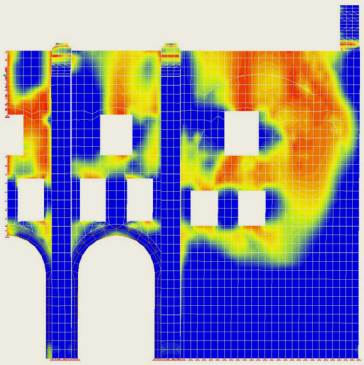
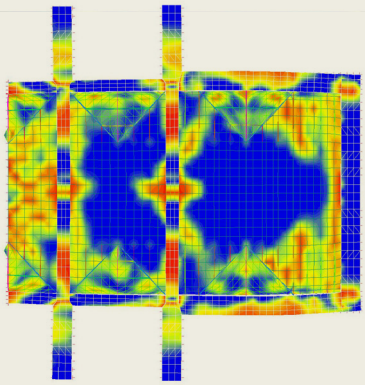






Caso 2. Carga máxima

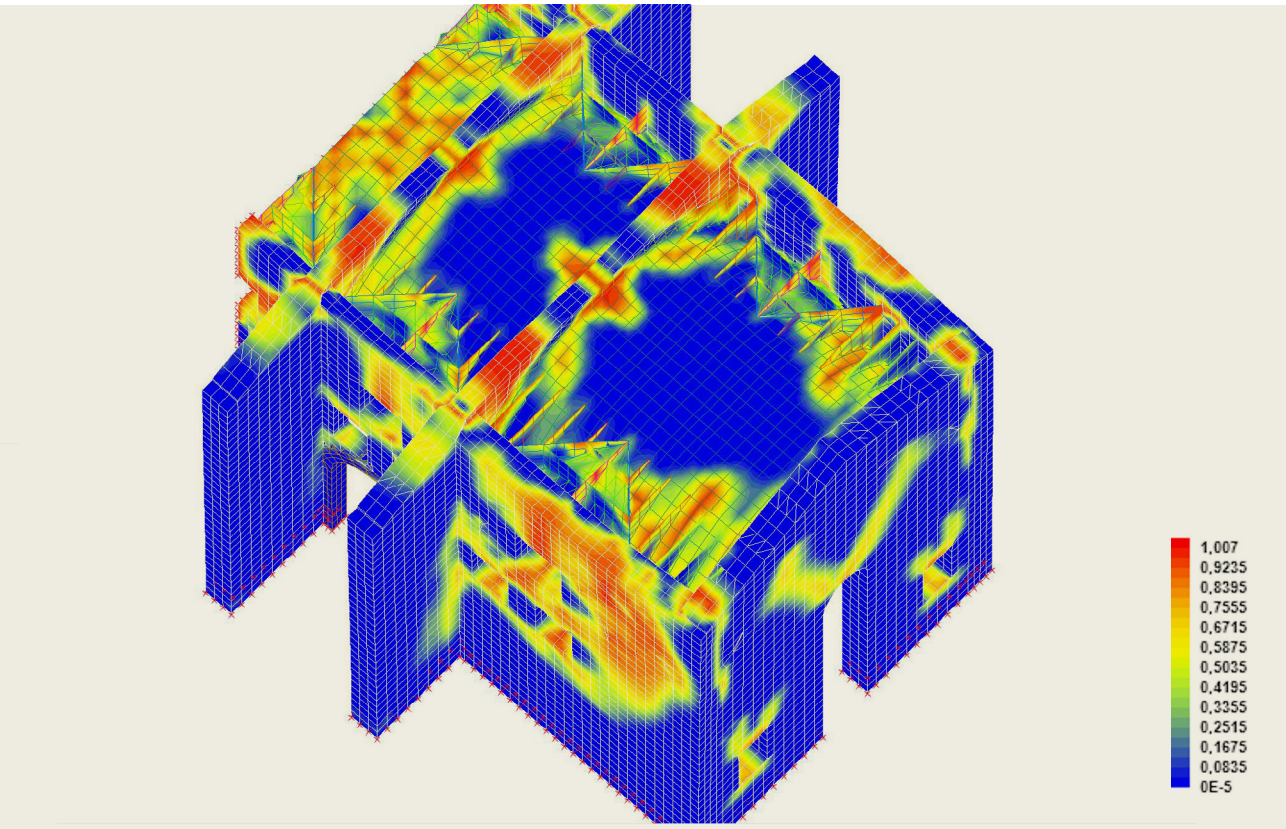
bóveda de cañón de medio punto con lunetos

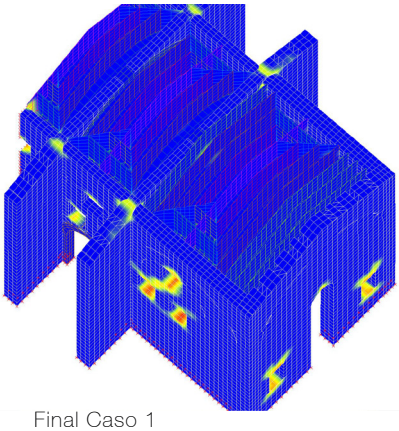
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

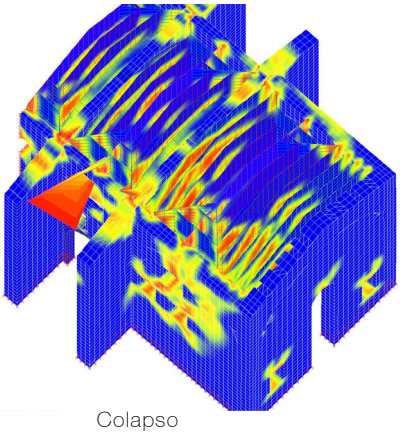
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
CL_01	6	1,1879	25	0,232	42	-0,1756	11,6	0,79
CL_02	6	1,1879	19	0,2537	26	-0,0409	12,685	0,87
CL_03	**6**	**1,1879**	**20**	**0,3153**	**44**	**0,095**	**15,765**	**1,08**
CL_04	6	1,1847	21	0,4601	26	NeuN	23,005	1,58





Final Caso 1



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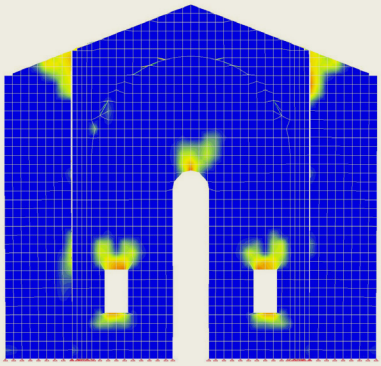
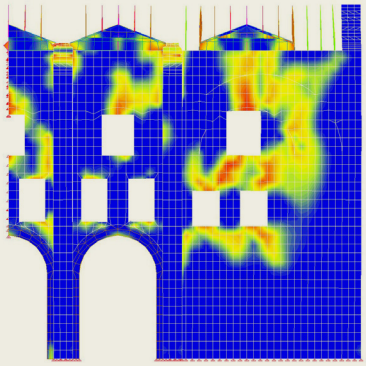
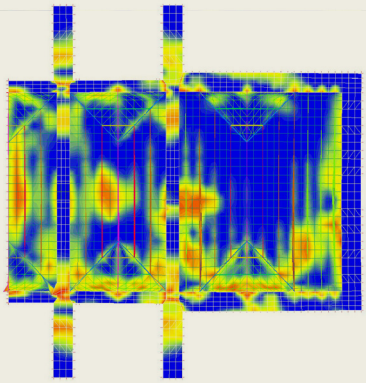






Caso 2. Carga máxima

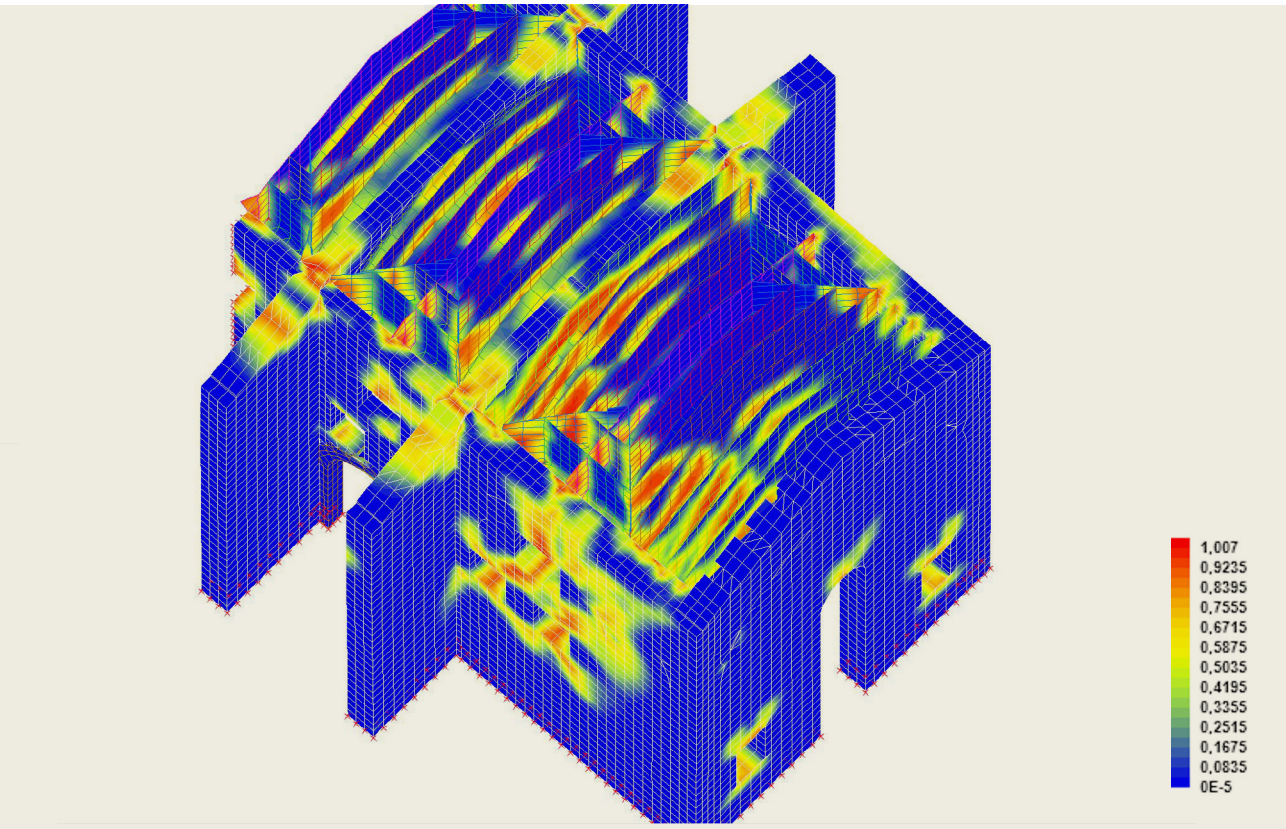
bóveda de cañón de medio punto con lunetos

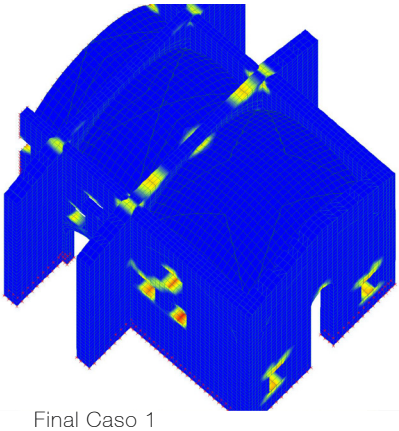
relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

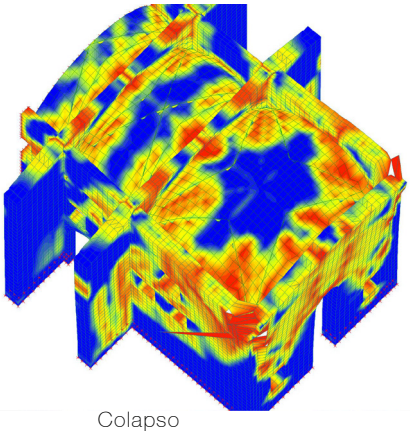
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
CL_01	6	1,1879	25	0,232	42	-0,1756	11,6	0,79
CL_02	6	1,1879	19	0,2537	26	-0,0409	12,685	0,87
CL_03	6	1,1879	20	0,3153	44	0,095	15,765	1,08
CL_04	**6**	**1,1847**	**21**	**0,4601**	**26**	**NeuN**	**23,005**	**1,58**





Final Caso 1



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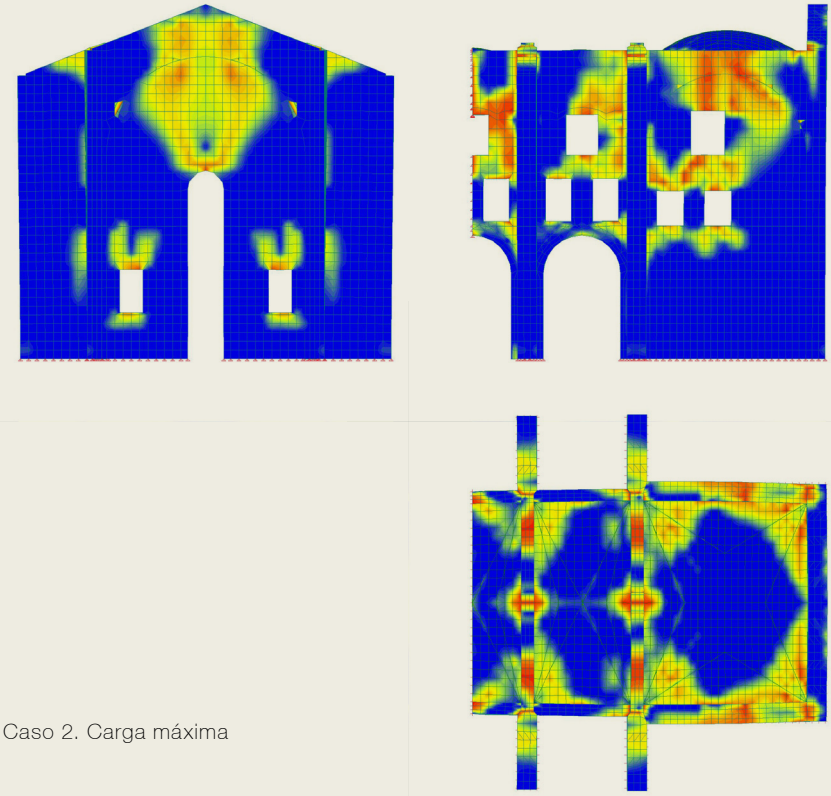


Caso 2. Carga máxima

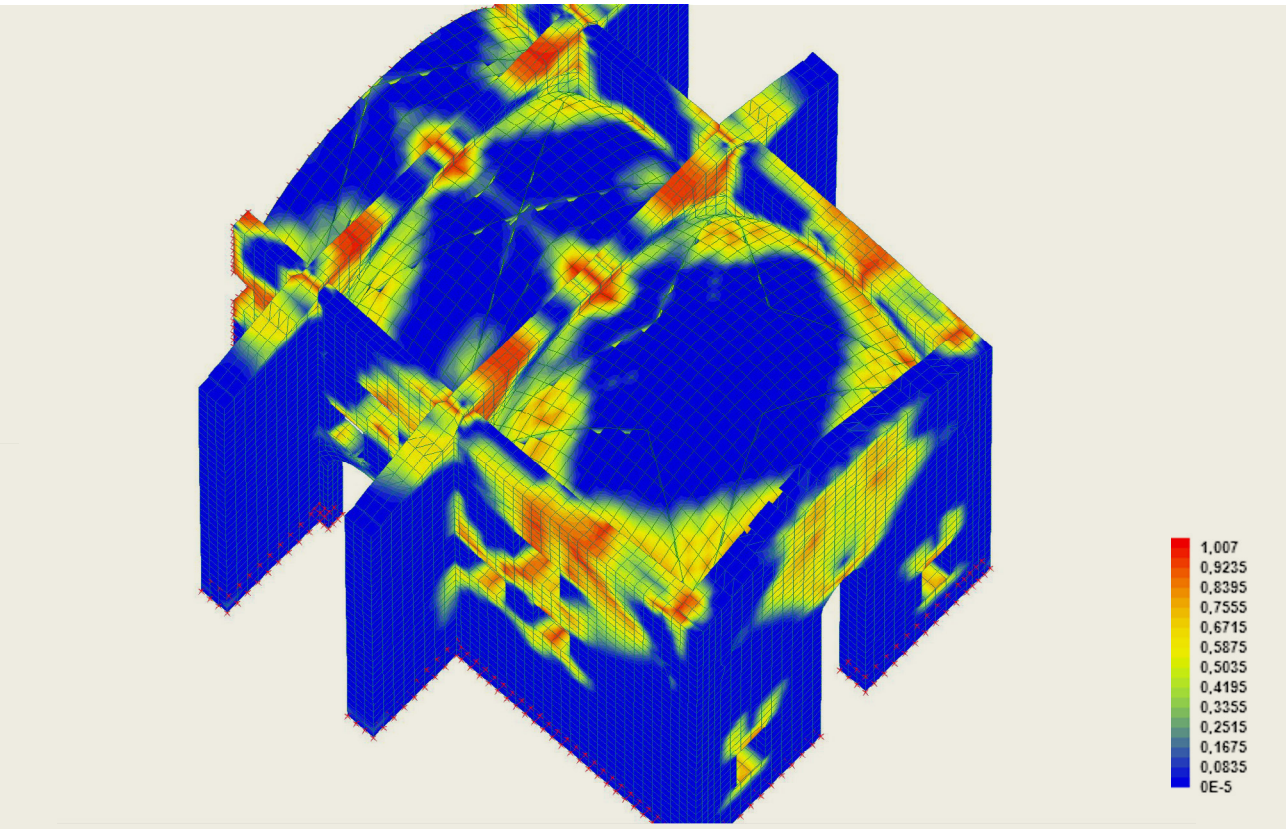
bóveda baída estrellada, nervaturas de ladrillo

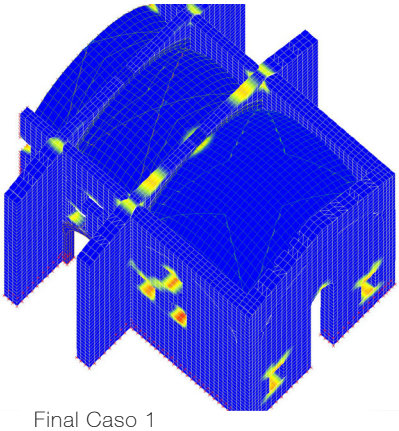
sin relleno de senos ni rigidizadores

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

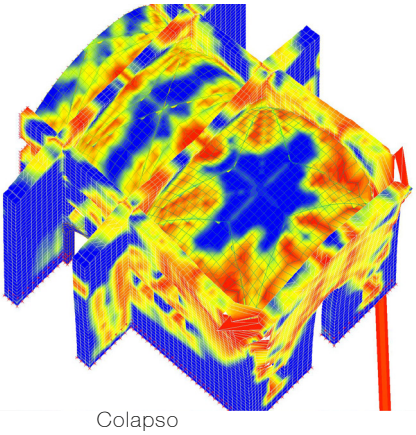
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNI_01	**6**	**1,1860**	**21**	**0,304**	**41**	**0,1015**	**15,2**	**1,04**
BNI_02	6	1,1860	22	0,3051	50	0,1096	15,255	1,04
BNI_03	6	1,1869	19	0,3652	33	NeuN	18,26	1,25
BNI_04	6	1,1857	17	0,3732	33	-4,90E+14	18,66	1,28

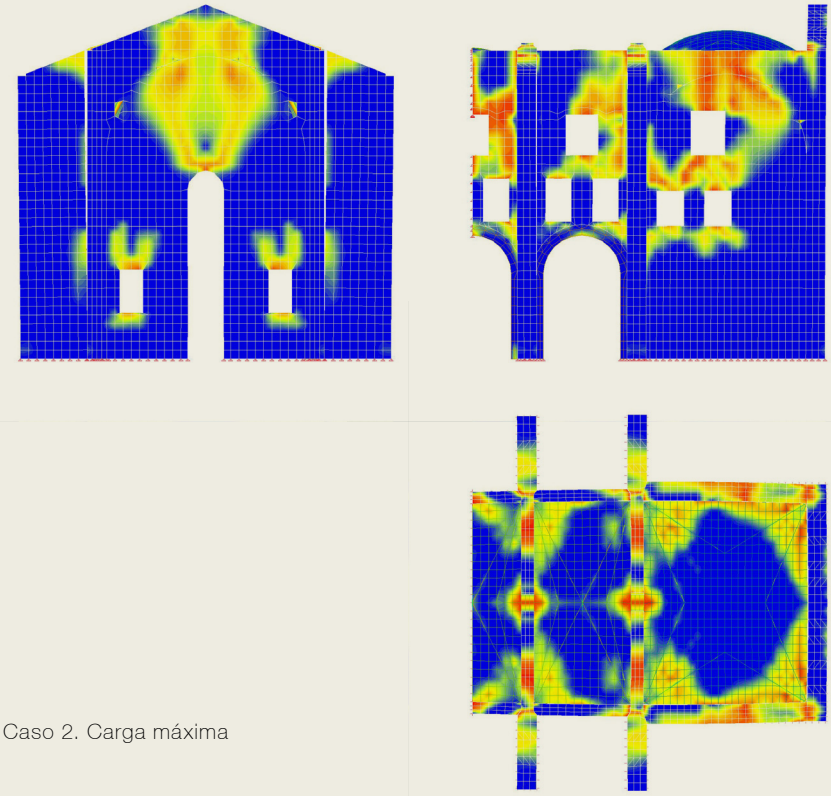




Final Caso 1



Colapso



Caso 2. Carga máxima

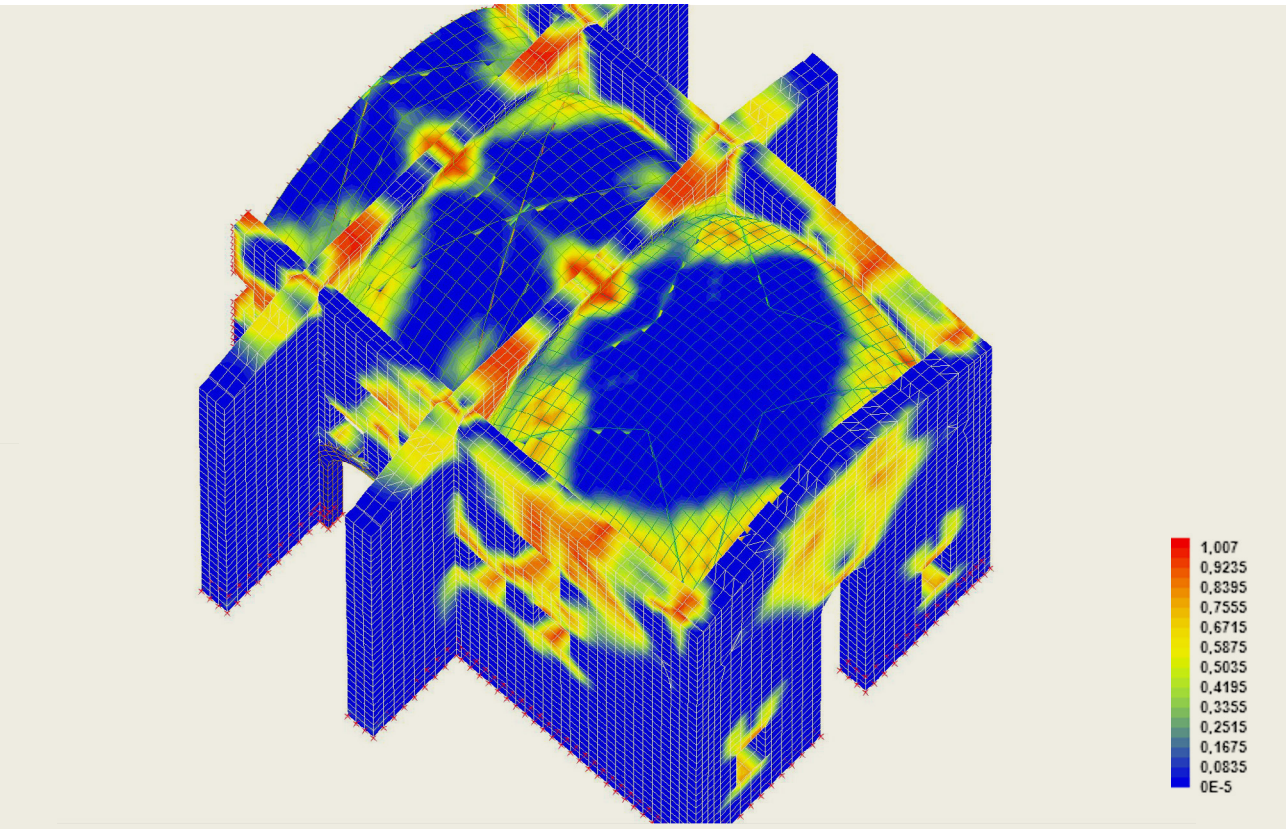
bóveda baída estrellada, nervaturas de ladrillo

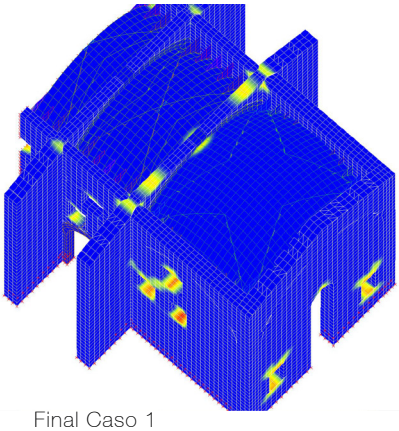
relleno de senos hasta 1/3 de h

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

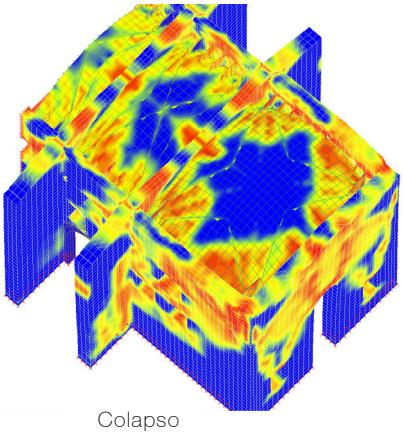
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNI_01	6	1,1860	21	0,304	41	0,1015	15,2	1,04
BNI_02	**6**	**1,1860**	**22**	**0,3051**	**50**	**0,1096**	**15,255**	**1,04**
BNI_03	6	1,1869	19	0,3652	33	NeuN	18,26	1,25
BNI_04	6	1,1857	17	0,3732	33	-4,90E+14	18,66	1,28

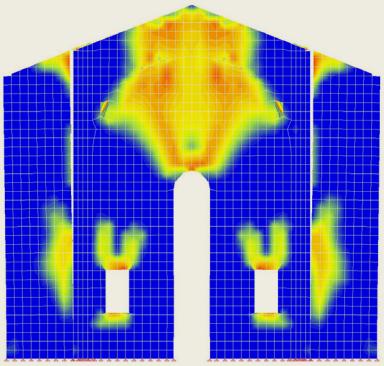


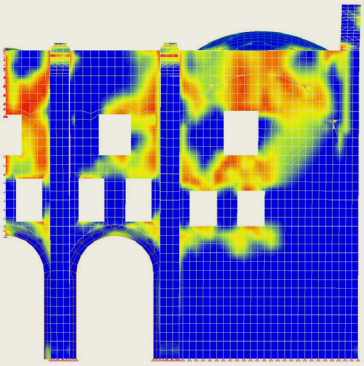


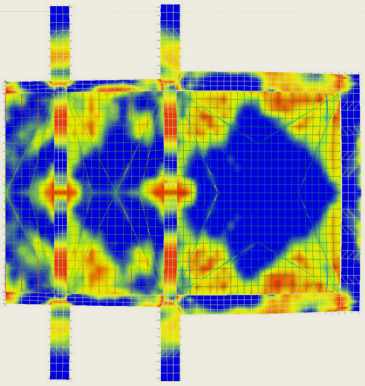
Final Caso 1



Colapso







Caso 2. Carga máxima

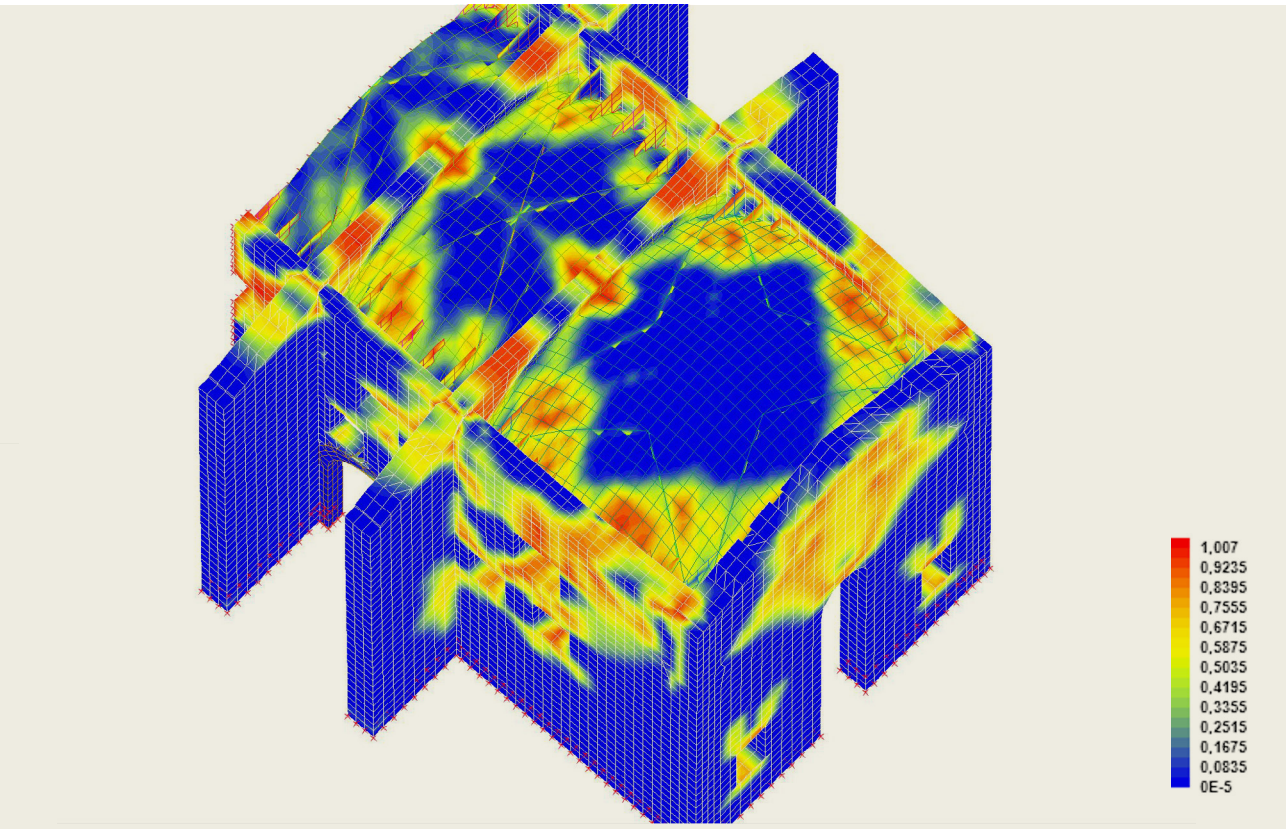
bóveda baída estrellada, nervaturas de ladrillo

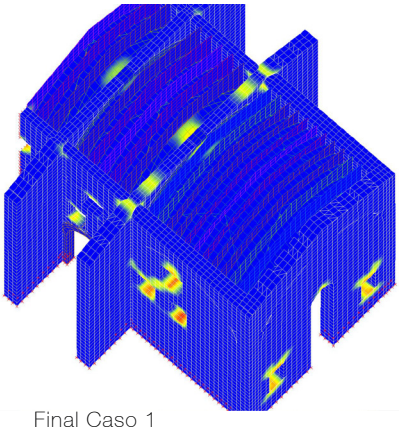
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

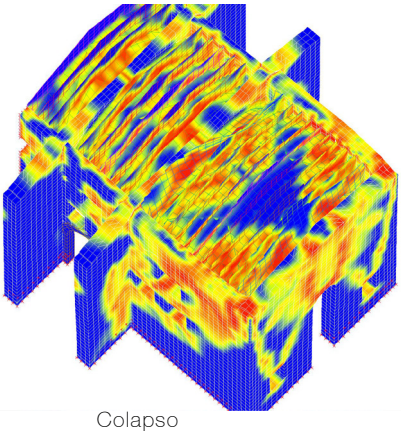
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNI_01	6	1,1860	21	0,304	41	0,1015	15,2	1,04
BNI_02	6	1,1860	22	0,3051	50	0,1096	15,255	1,04
BNI_03	**6**	**1,1869**	**19**	**0,3652**	**33**	**NeuN**	**18,26**	**1,25**
BNI_04	6	1,1857	17	0,3732	33	-4,90E+14	18,66	1,28





Final Caso 1



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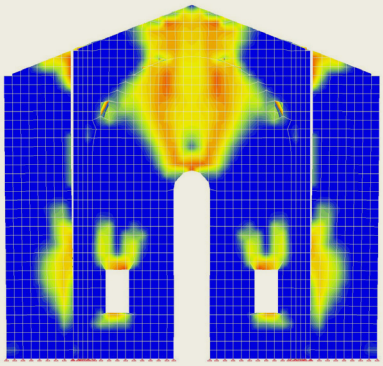
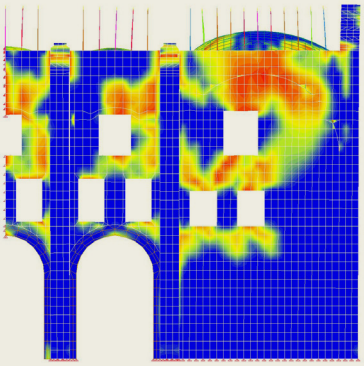
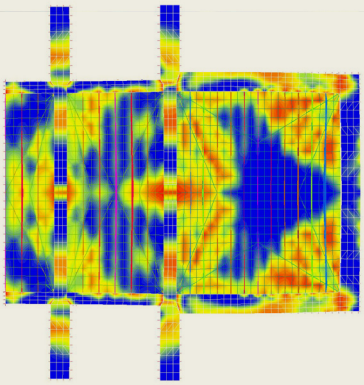






Caso 2. Carga máxima

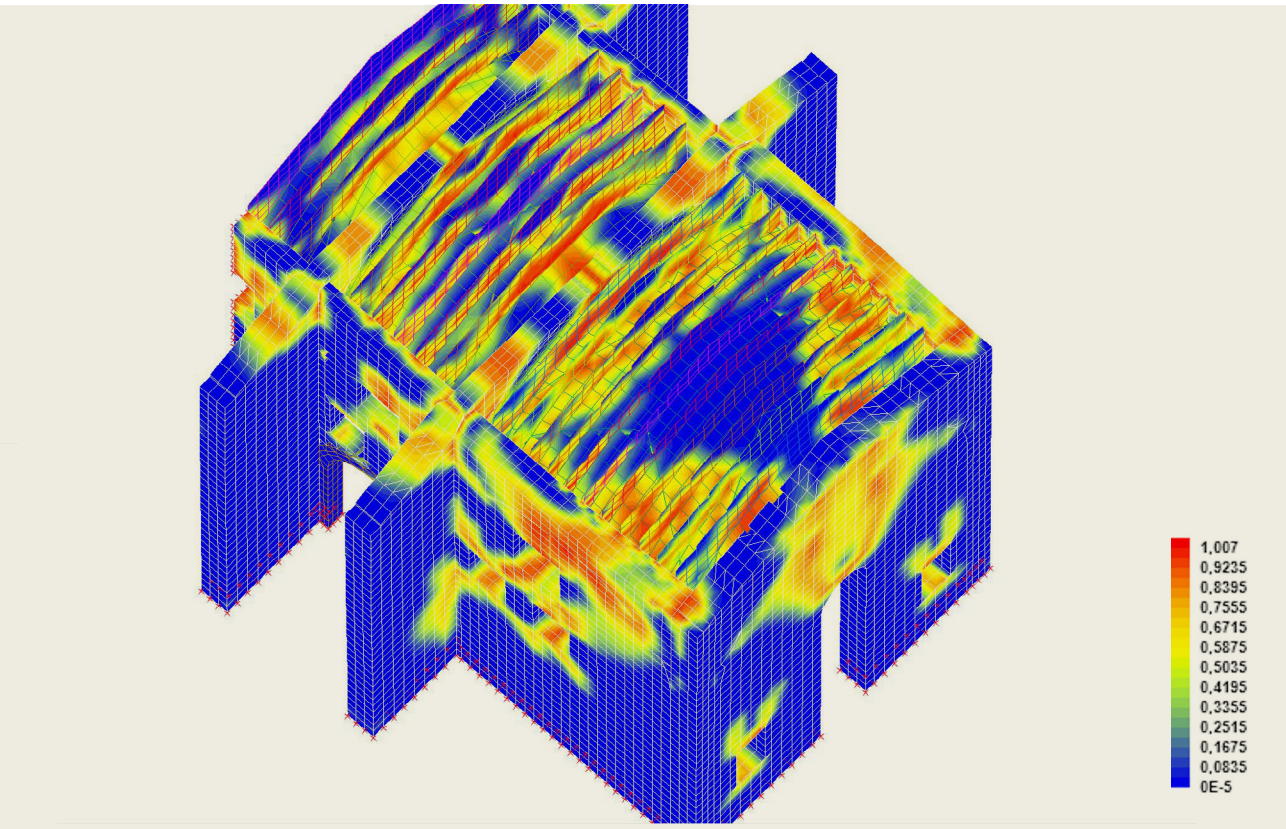
bóveda baída estrellada, nervaturas de ladrillo

relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

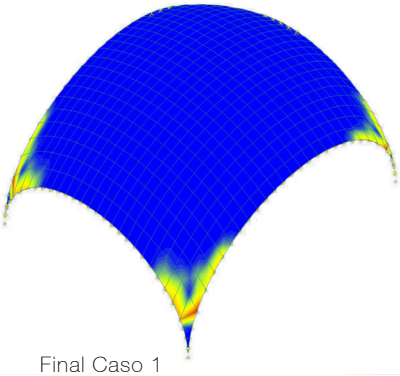
combinaciones	H1	H7	H8
peso propio	pp	-	-
sobrecarga	-	10	10
comb 1	1	0	0
comb 2	0	5	5

materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

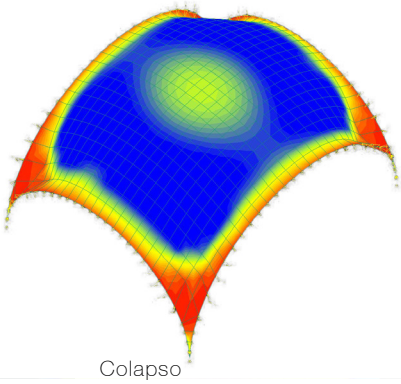
	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNI_01	6	1,1860	21	0,304	41	0,1015	15,2	1,04
BNI_02	6	1,1860	22	0,3051	50	0,1096	15,255	1,04
BNI_03	6	1,1869	19	0,3652	33	NeuN	18,26	1,25
BNI_04	**6**	**1,1857**	**17**	**0,3732**	**33**	**-4,90E+14**	**18,66**	**1,28**



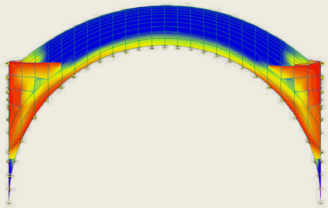
bóvedas sobre apoyos rígidos

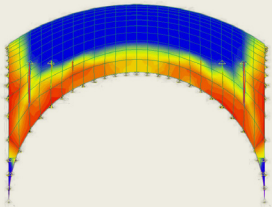


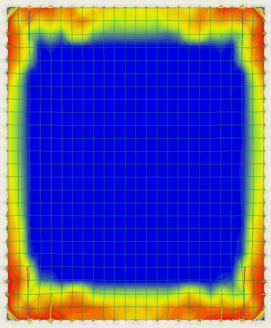
Final Caso 1



Colapso







Caso 2. Carga máxima

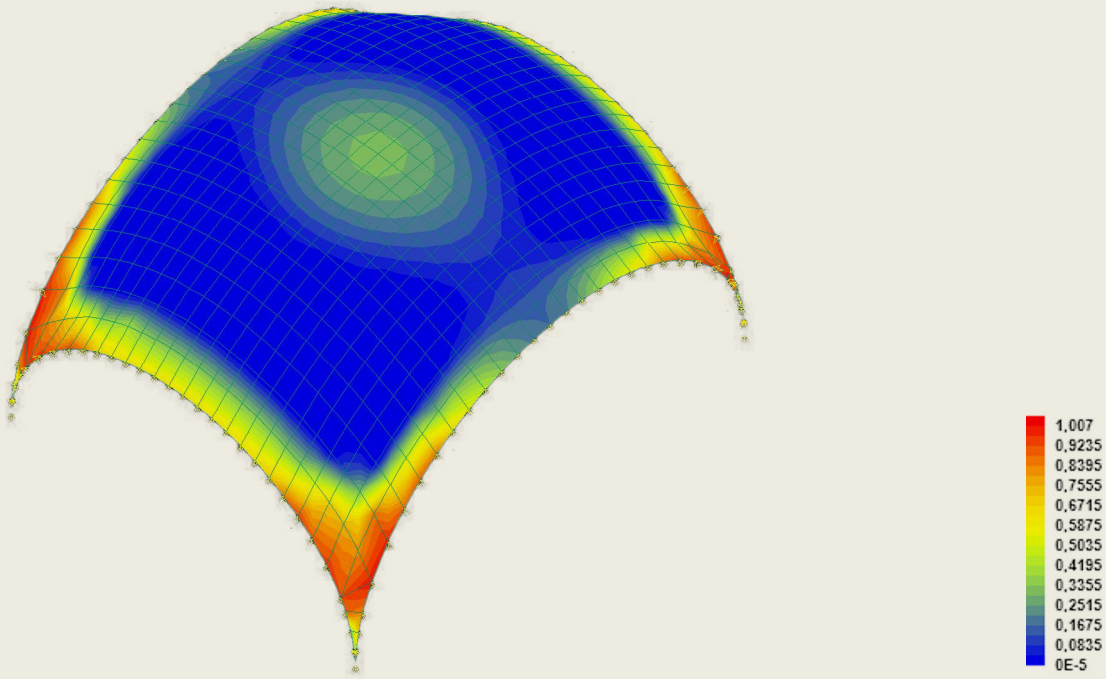
bóveda baída de envolvente esférica

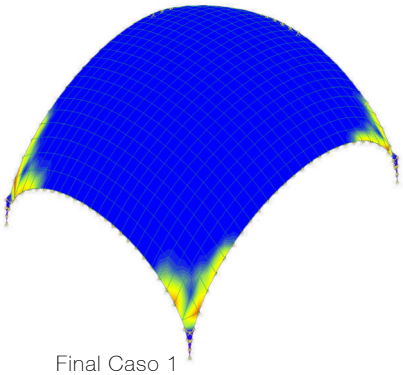
sin relleno de senos ni rigidizadores

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

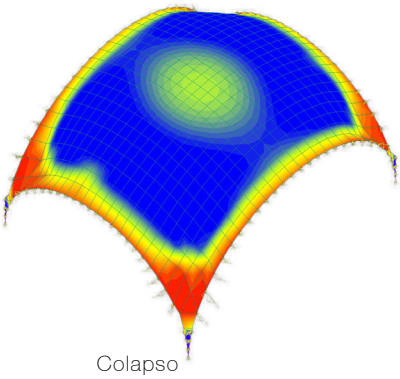
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
B_01	**6**	**1,1945**	**16**	**0,6738**	**50**	**0,6644**	**67,38**	**1,00**
B_02	6	1,1945	19	0,6724	50	0,6447	67,24	1,00
B_03	6	1,1849	20	0,6121	28	NeuN	61,21	0,91
B_04	6	1,0793	20	0,7391	50	-2,9146	73,91	1,10

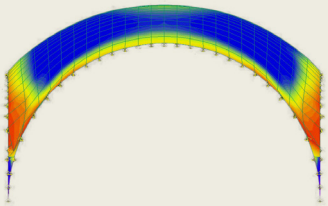


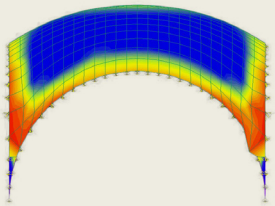


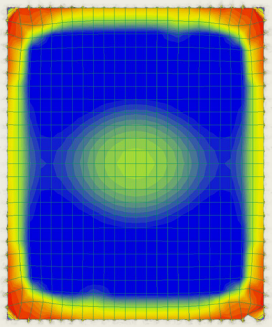
Final Caso 1



Colapso







Caso 2. Carga máxima

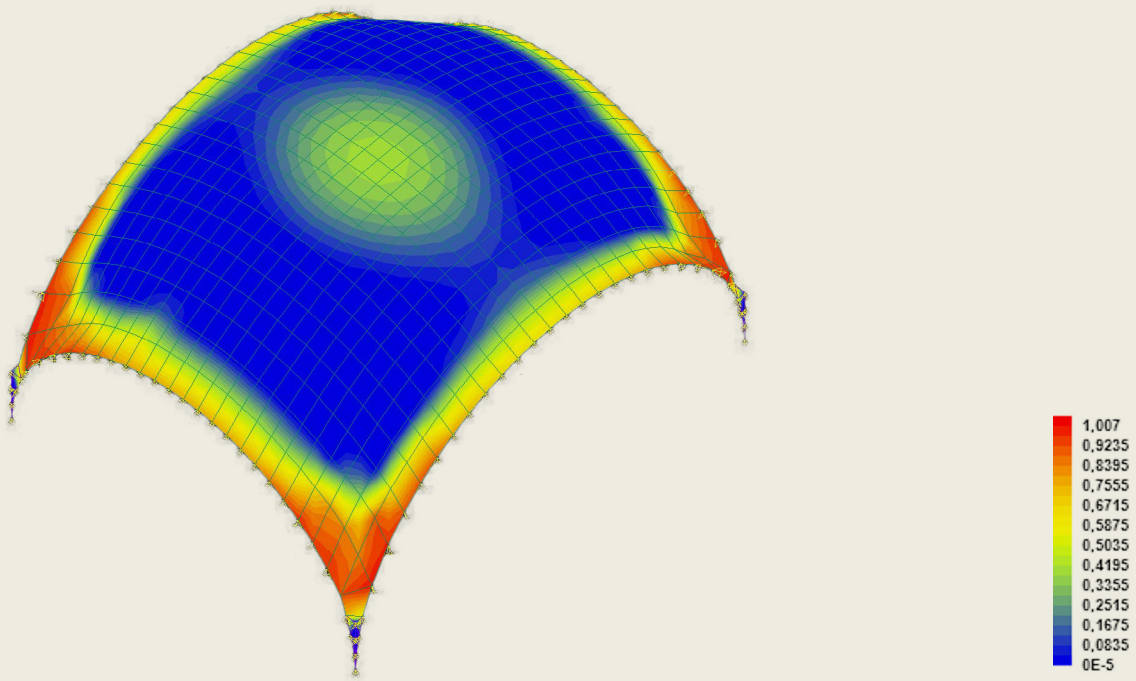
bóveda baída de envolvente esférica

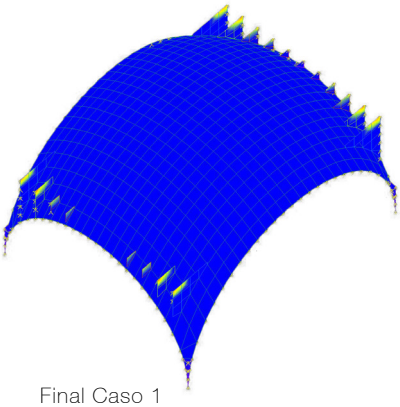
relleno de senos hasta 1/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

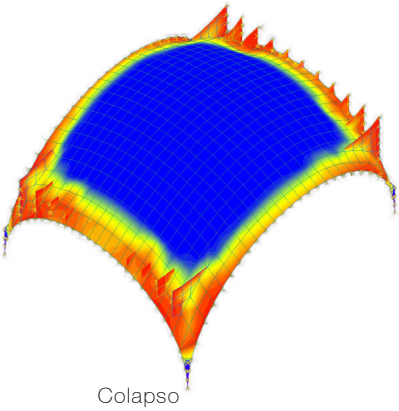
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
B_01	6	1,1945	16	0,6738	50	0,6644	67,38	1,00
B_02	**6**	**1,1945**	**19**	**0,6724**	**50**	**0,6447**	**67,24**	**1,00**
B_03	6	1,1849	20	0,6121	28	NeuN	61,21	0,91
B_04	6	1,0793	20	0,7391	50	-2,9146	73,91	1,10

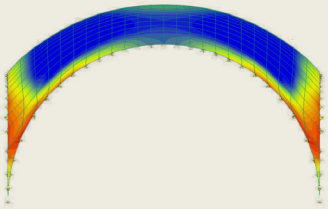


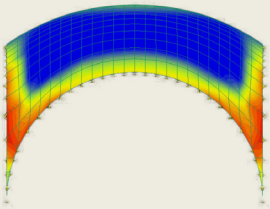


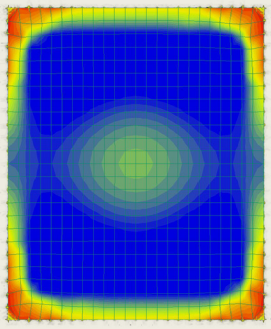
Final Caso 1



Colapso







Caso 2. Carga máxima

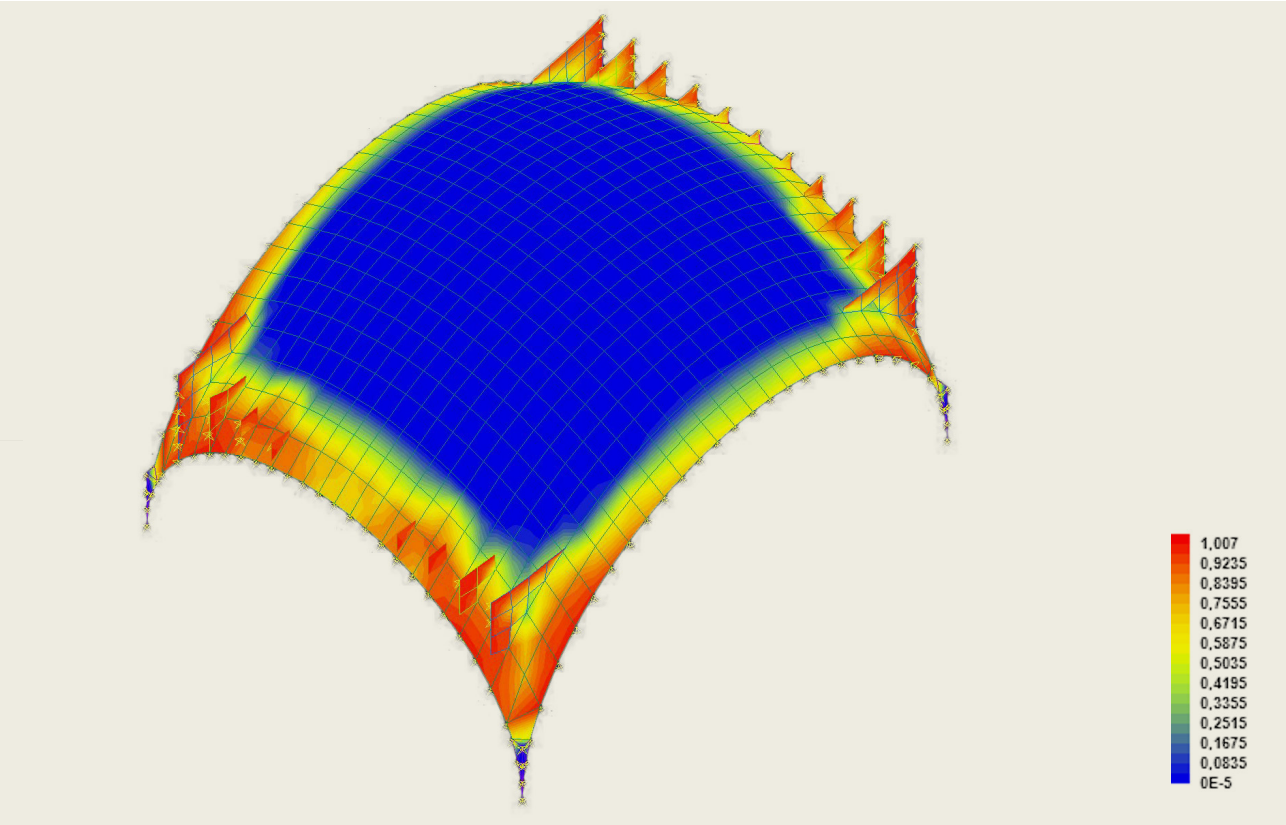
bóveda baída de envolvente esférica

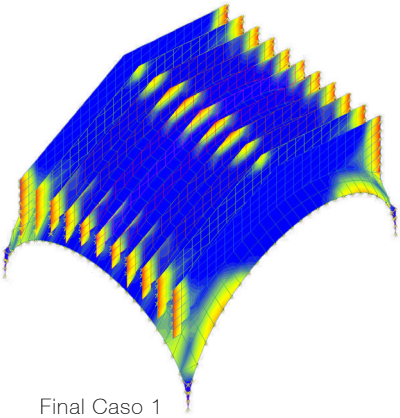
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

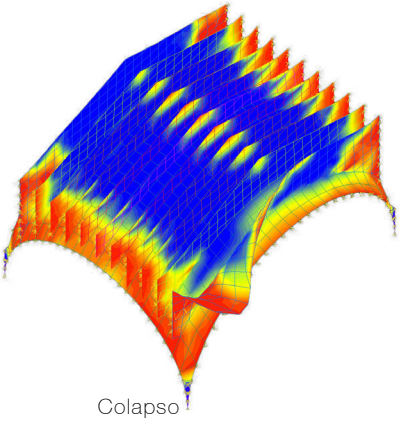
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
B_01	6	1,1945	16	0,6738	50	0,6644	67,38	1,00
B_02	6	1,1945	19	0,6724	50	0,6447	67,24	1,00
B_03	**6**	**1,1849**	**20**	**0,6121**	**28**	**NeuN**	**61,21**	**0,91**
B_04	6	1,0793	20	0,7391	50	-2,9146	73,91	1,10





Final Caso 1



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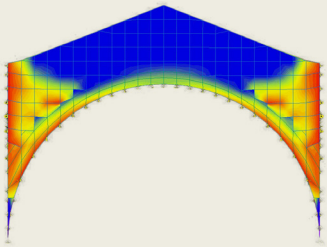
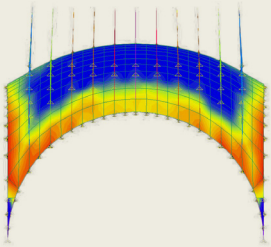
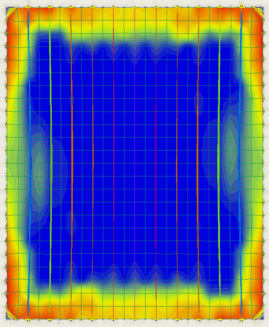






Caso 2. Carga máxima

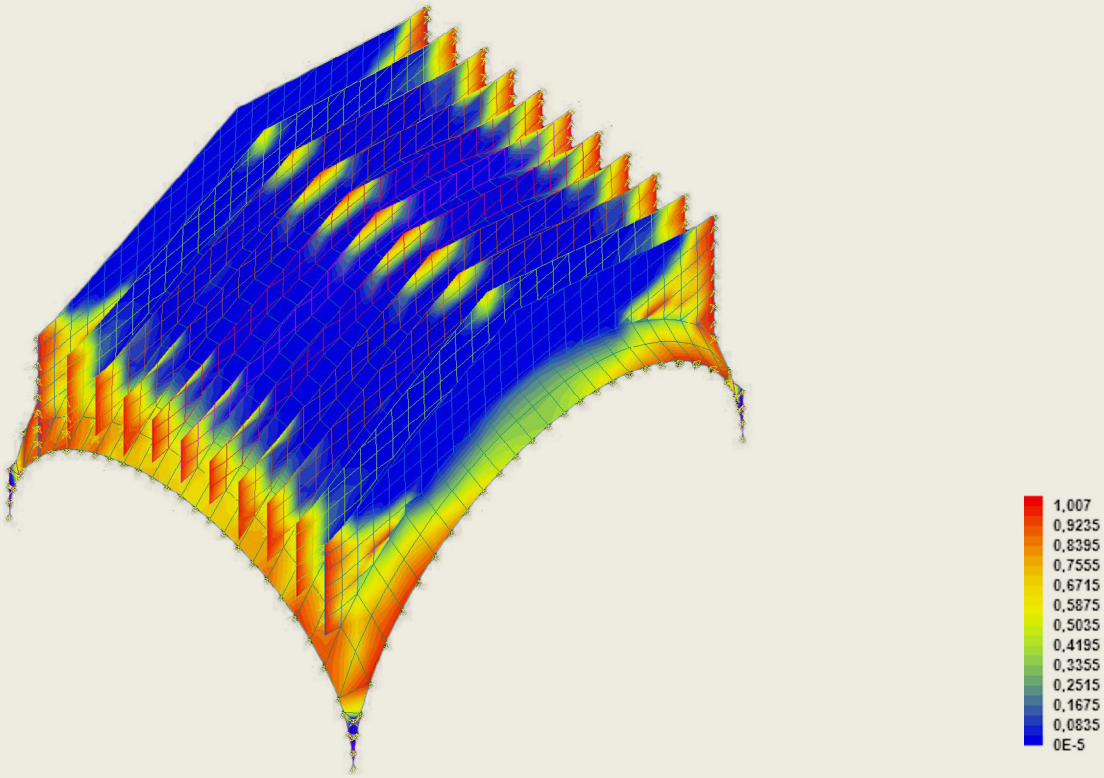
bóveda baída de envolvente esférica

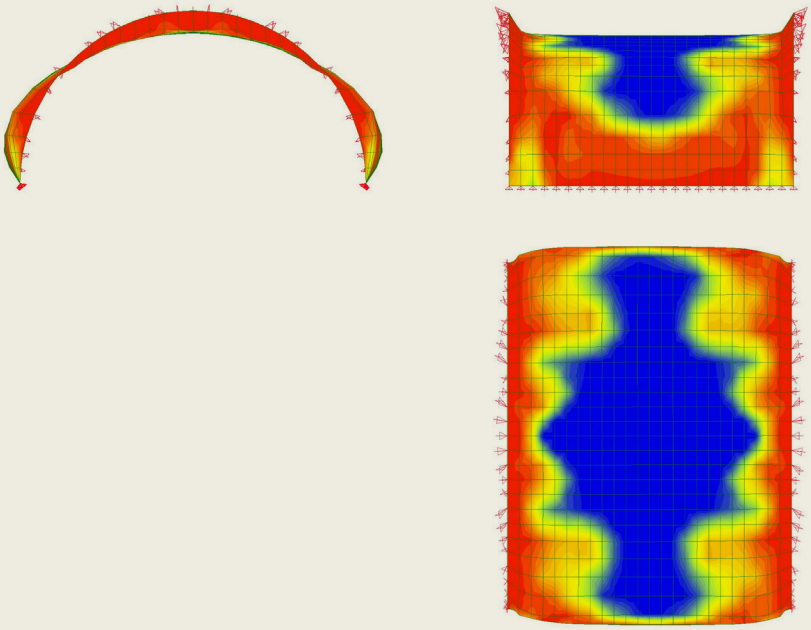
relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
B_01	6	1,1945	16	0,6738	50	0,6644	67,38	1,00
B_02	6	1,1945	19	0,6724	50	0,6447	67,24	1,00
B_03	6	1,1849	20	0,6121	28	NeuN	61,21	0,91
B_04	**6**	**1,0793**	**20**	**0,7391**	**50**	**-2,9146**	**73,91**	**1,10**





Final Caso 1

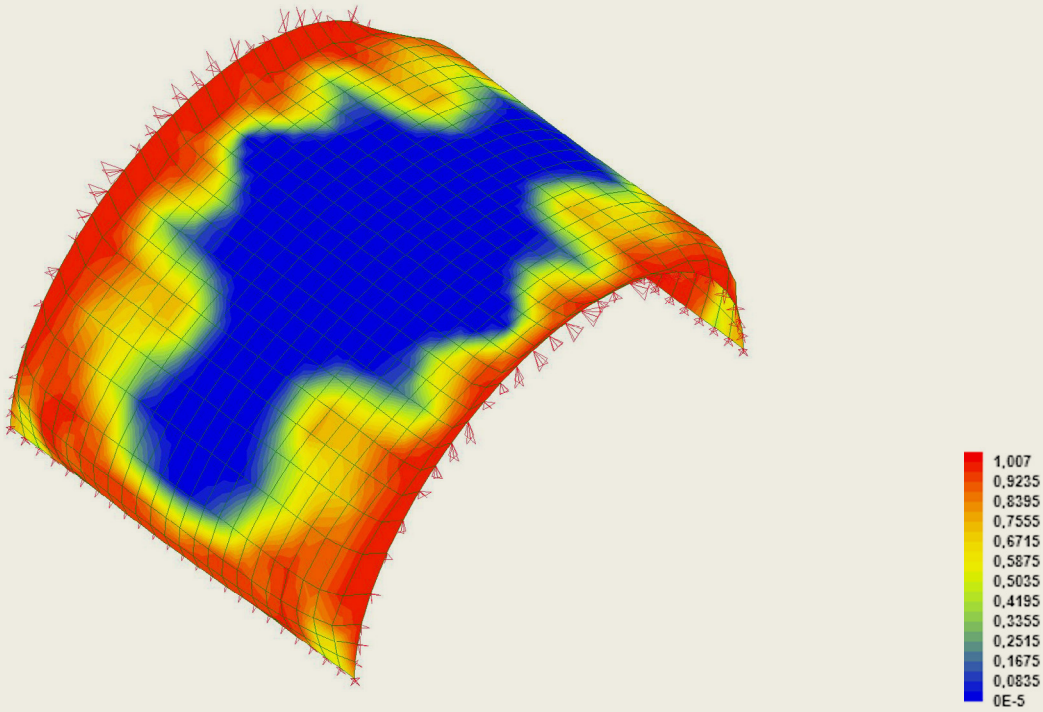
bóveda de cañón de medio punto

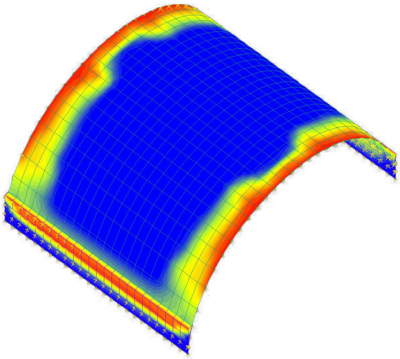
sin relleno de senos ni rigidizadores

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

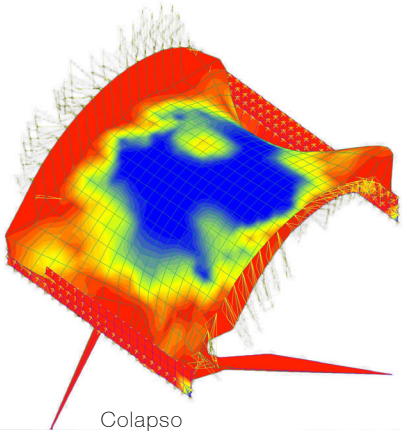
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
C_01	90	0,6925					0	0,00
C_02	59	1,0086	64	0,0613	67	0,0285	6,13	0,09
C_03	09	1,0702	13	0,1447	18	NeuN	14,47	0,21
C_04	15	1,0375	25	0,2364	28	NeuN	23,64	0,35

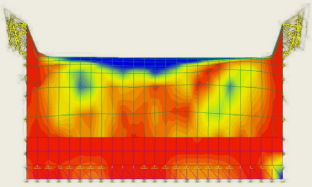


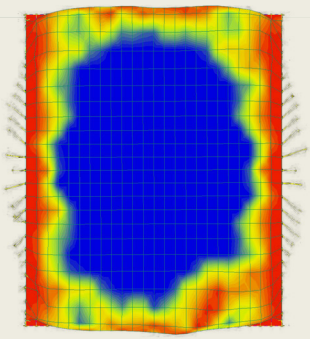


Final Caso 1



Colapso





Caso 2. Carga máxima

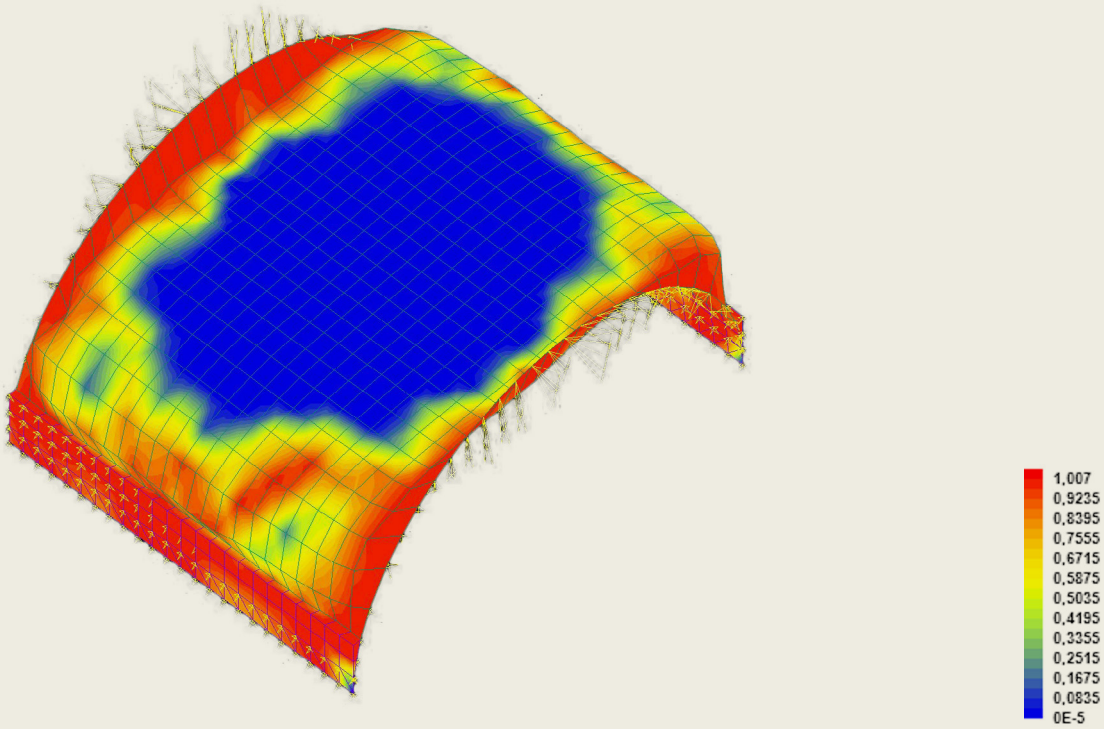
bóveda de cañón de medio punto

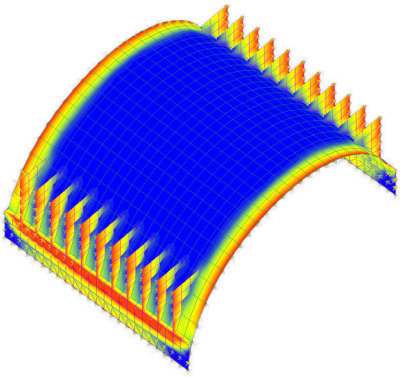
relleno de senos hasta 1/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

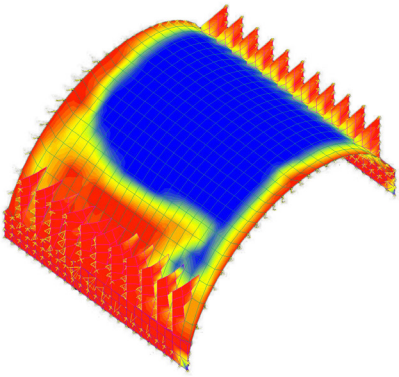
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
C_01	90	0,6925					0	0,00
C_02	**59**	**1,0086**	**64**	**0,0613**	**67**	**0,0285**	**6,13**	**0,09**
C_03	09	1,0702	13	0,1447	18	NeuN	14,47	0,21
C_04	15	1,0375	25	0,2364	28	NeuN	23,64	0,35

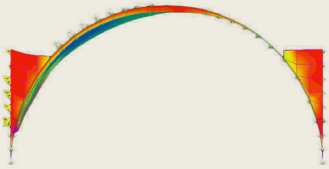


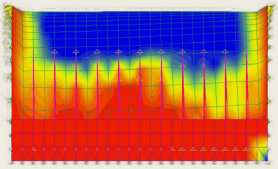


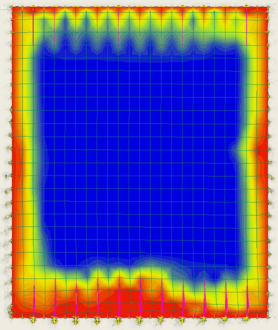
Final Caso 1



Colapso







Caso 2. Carga máxima

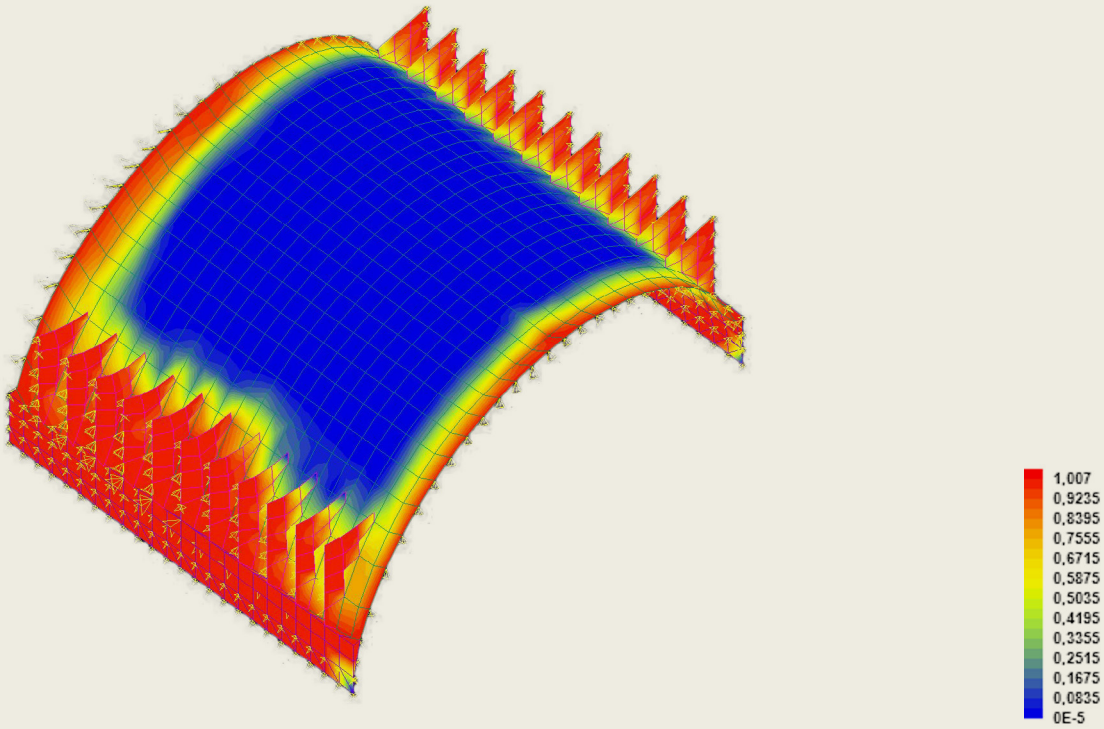
bóveda de cañón de medio punto

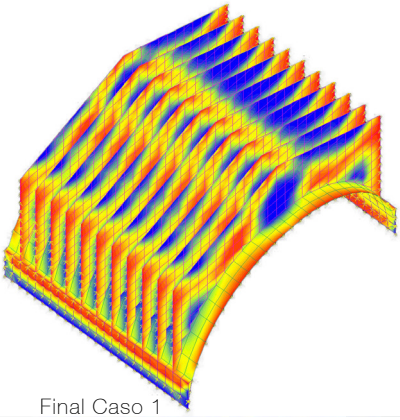
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

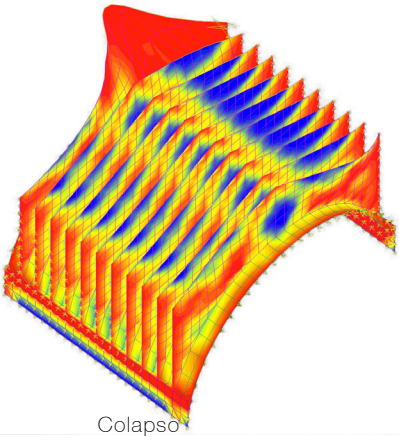
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
C_01	90	0,6925					0	0,00
C_02	59	1,0086	64	0,0613	67	0,0285	6,13	0,09
C_03	**09**	**1,0702**	**13**	**0,1447**	**18**	**NeuN**	**14,47**	**0,21**
C_04	15	1,0375	25	0,2364	28	NeuN	23,64	0,35





Final Caso 1



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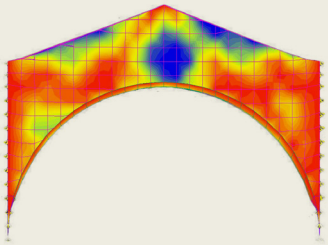
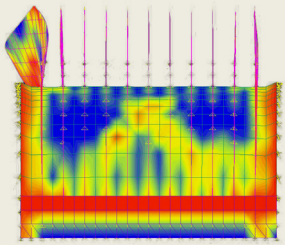
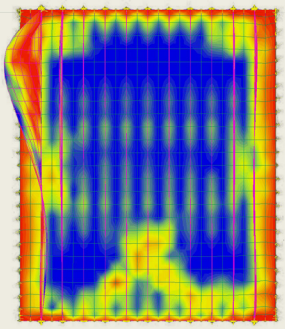






Caso 2. Carga máxima

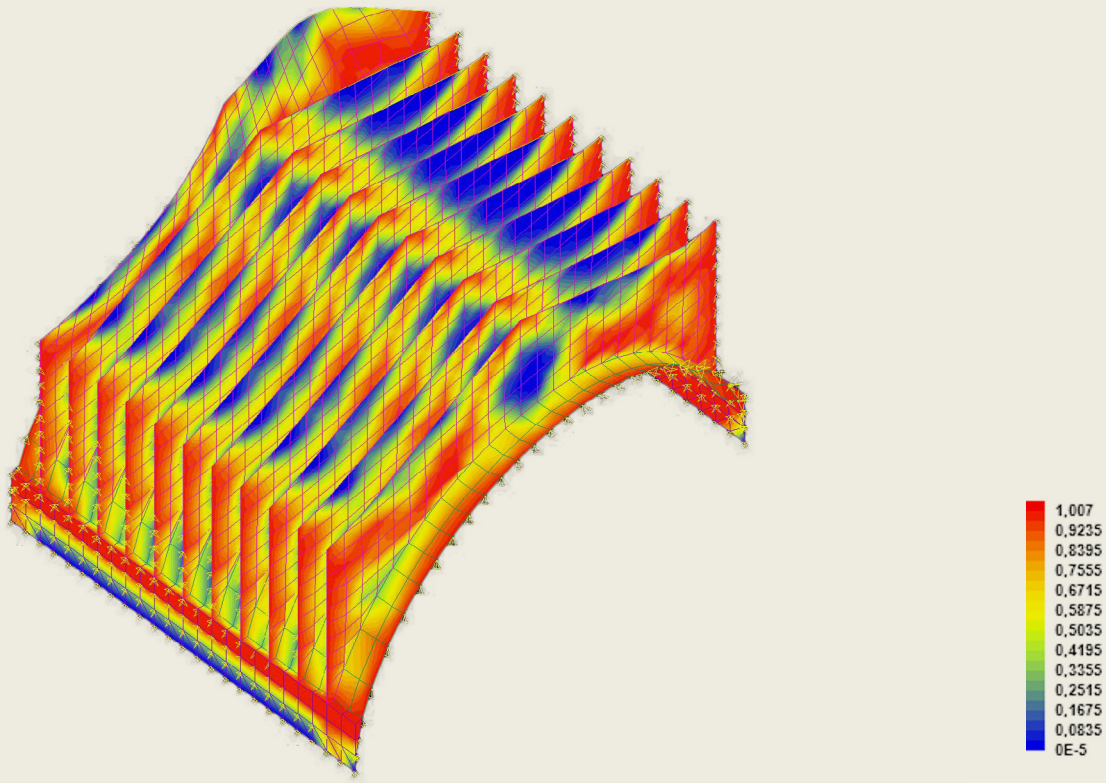
bóveda de cañón de medio punto

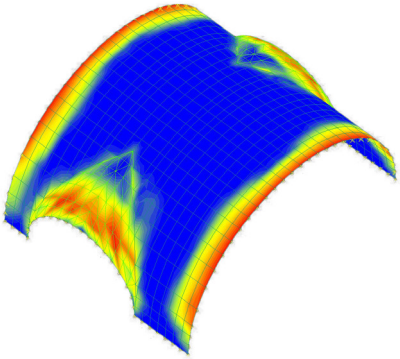
relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

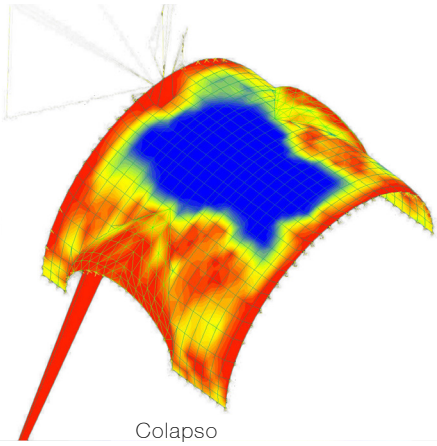
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
C_01	90	0,6925					0	0,00
C_02	59	1,0086	64	0,0613	67	0,0285	6,13	0,09
C_03	09	1,0702	13	0,1447	18	NeuN	14,47	0,21
C_04	**15**	**1,0375**	**25**	**0,2364**	**28**	**NeuN**	**23,64**	**0,35**





Final Caso 1



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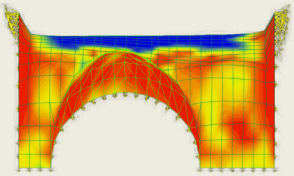
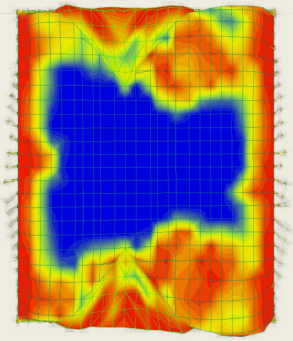




Caso 2. Carga máxima

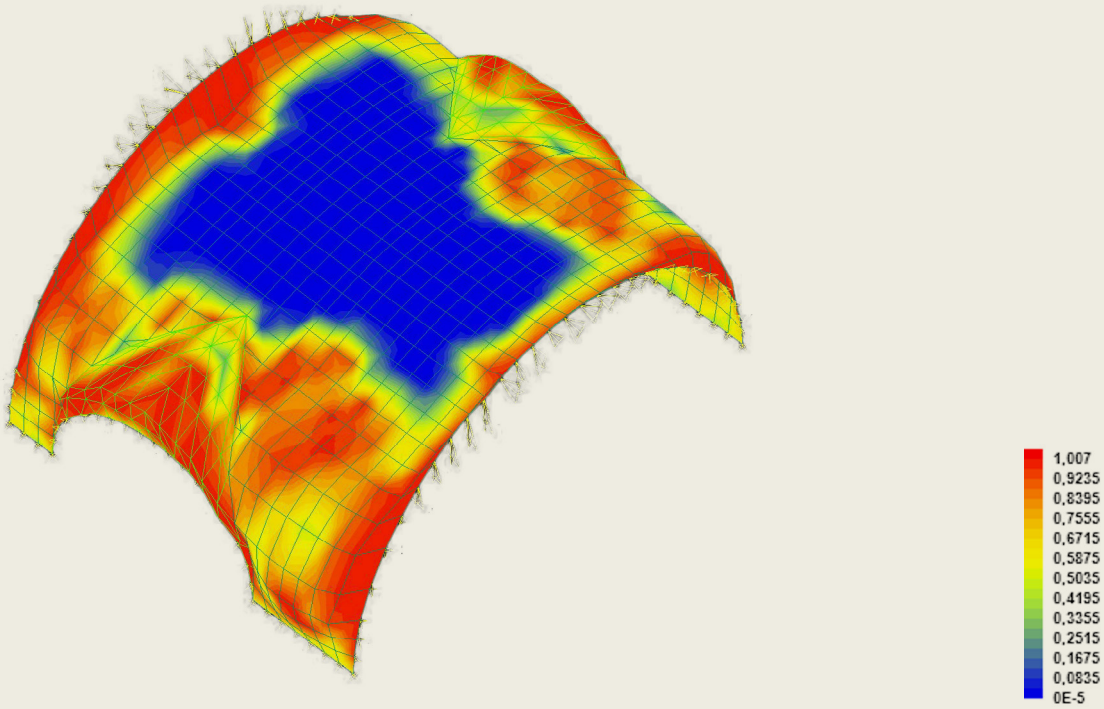
bóveda de cañón de medio punto con lunetos

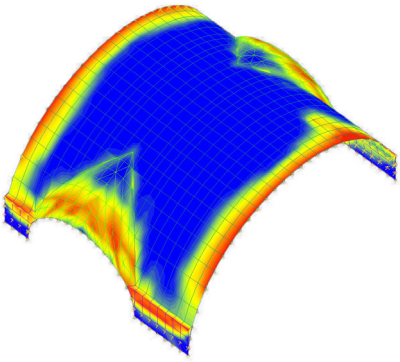
sin relleno de senos ni rigidizadores

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

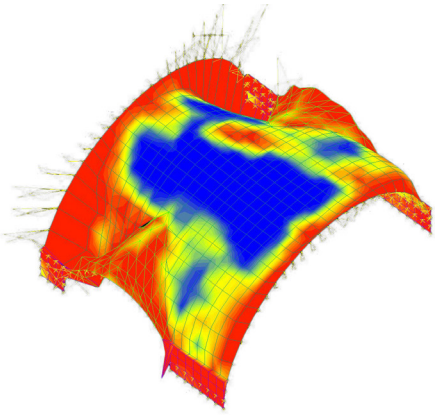
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
CL_01	15	1,0403	23	0,0444	28	-0,0018	4,44	0,07
CL_02	16	1,0013	18	0,0517	23	-0,0129	5,17	0,08
CL_03	11	1,01	18	0,0981	50	0,0167	9,81	0,15
CL_04	21	1,019	28	0,1224	30	-161565	12,24	0,18

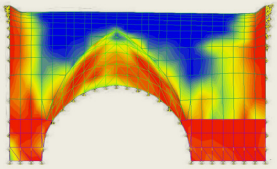


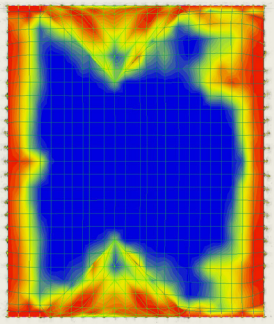


Final Caso 1



Colapso





Caso 2. Carga máxima

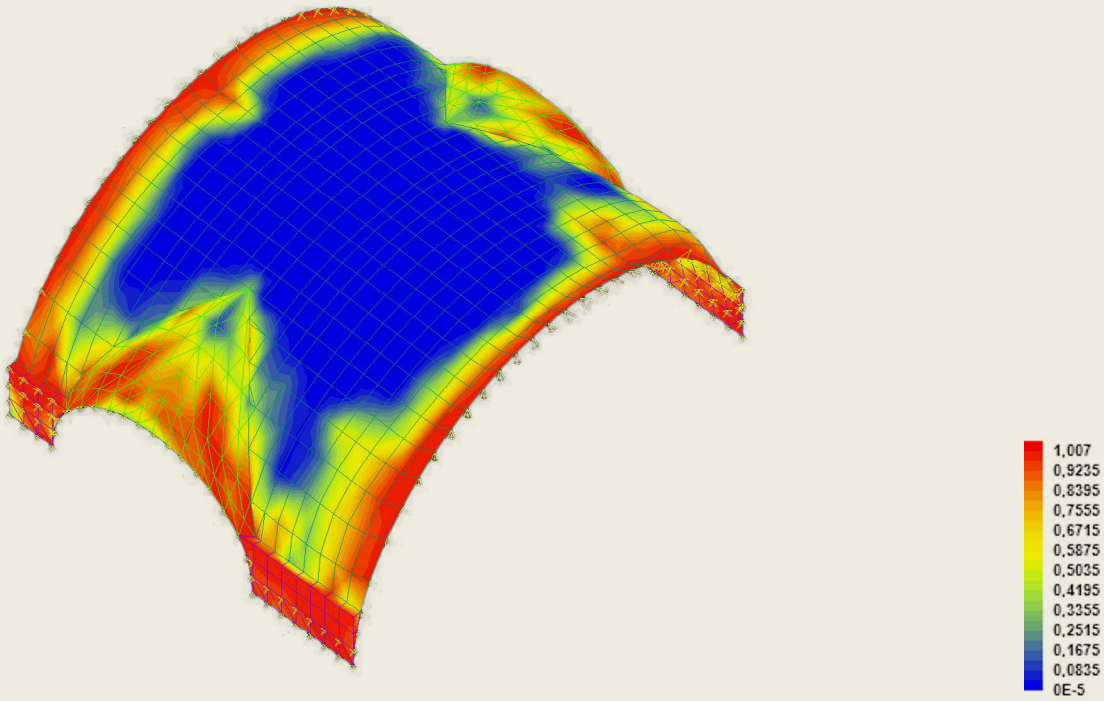
bóveda de cañón de medio punto con lunetos

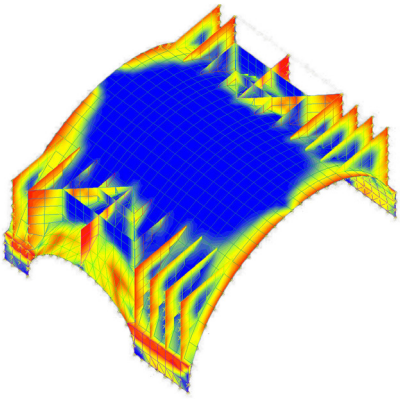
relleno de senos hasta 1/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

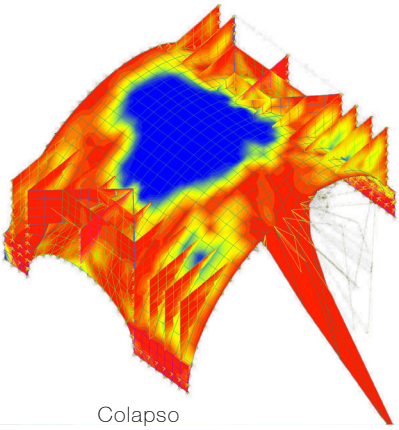
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
CL_01	15	1,0403	23	0,0444	28	-0,0018	4,44	0,07
CL_02	**16**	**1,0013**	**18**	**0,0517**	**23**	**-0,0129**	**5,17**	**0,08**
CL_03	11	1,01	18	0,0981	50	0,0167	9,81	0,15
CL_04	21	1,019	28	0,1224	30	-161565	12,24	0,18

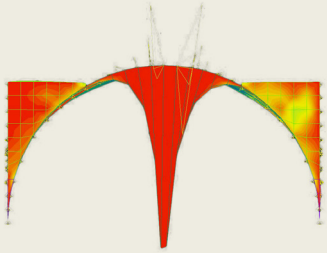


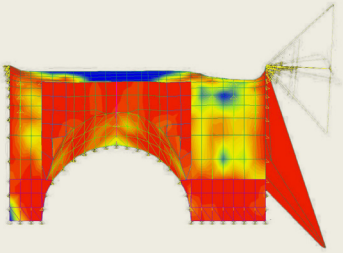


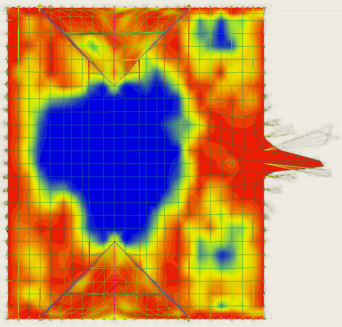
Final Caso 1



Colapso







Caso 2. Carga máxima

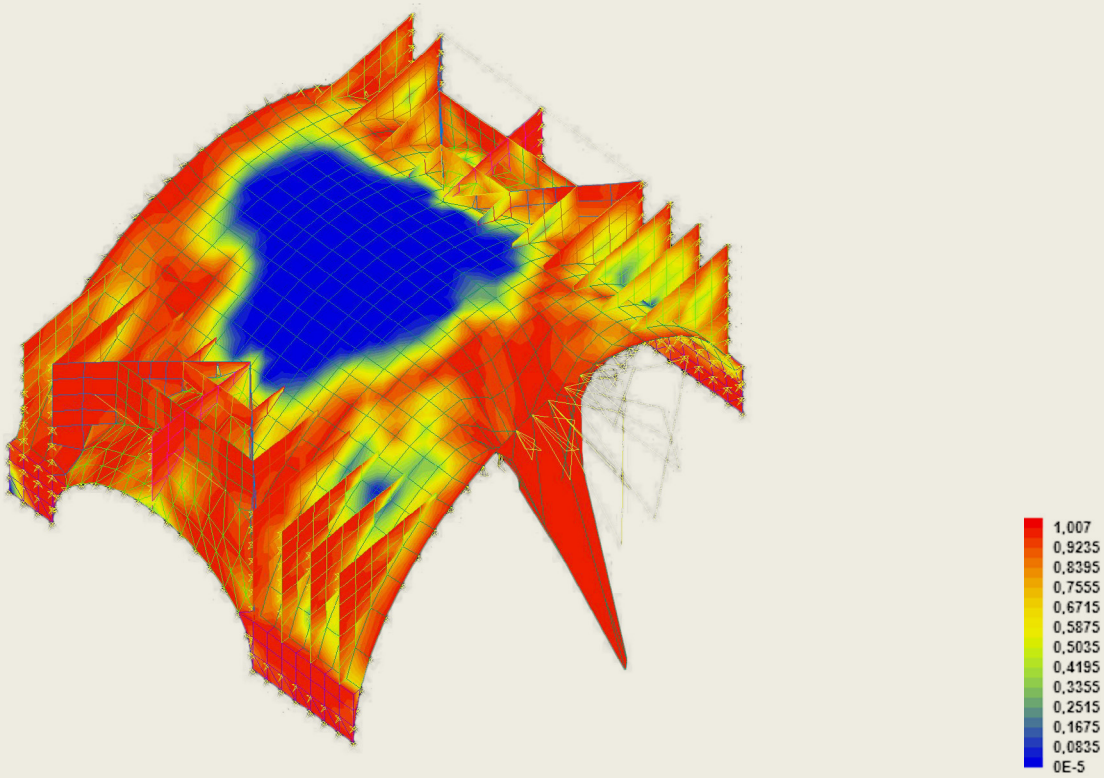
bóveda de cañón de medio punto con lunetos

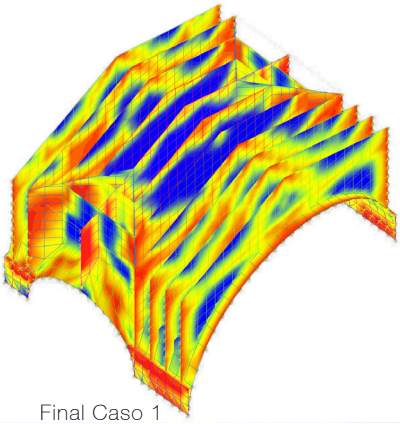
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

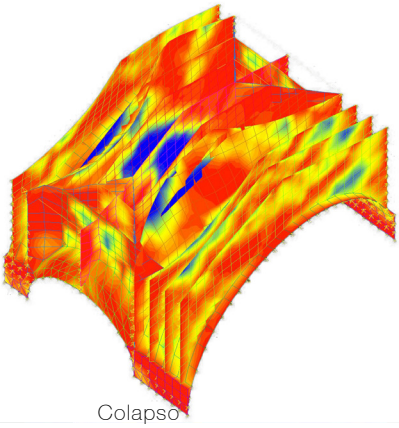
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
CL_01	15	1,0403	23	0,0444	28	-0,0018	4,44	0,07
CL_02	16	1,0013	18	0,0517	23	-0,0129	5,17	0,08
CL_03	**11**	**1,01**	**18**	**0,0981**	**50**	**0,0167**	**9,81**	**0,15**
CL_04	21	1,019	28	0,1224	30	-161565	12,24	0,18

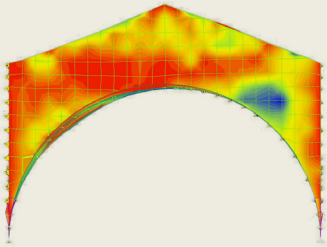


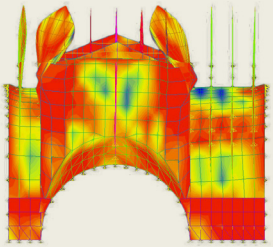


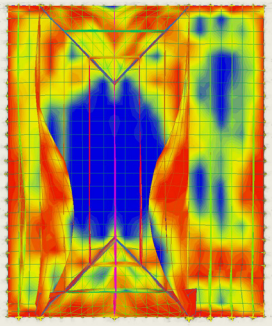
Final Caso 1



Colapso







Caso 2. Carga máxima

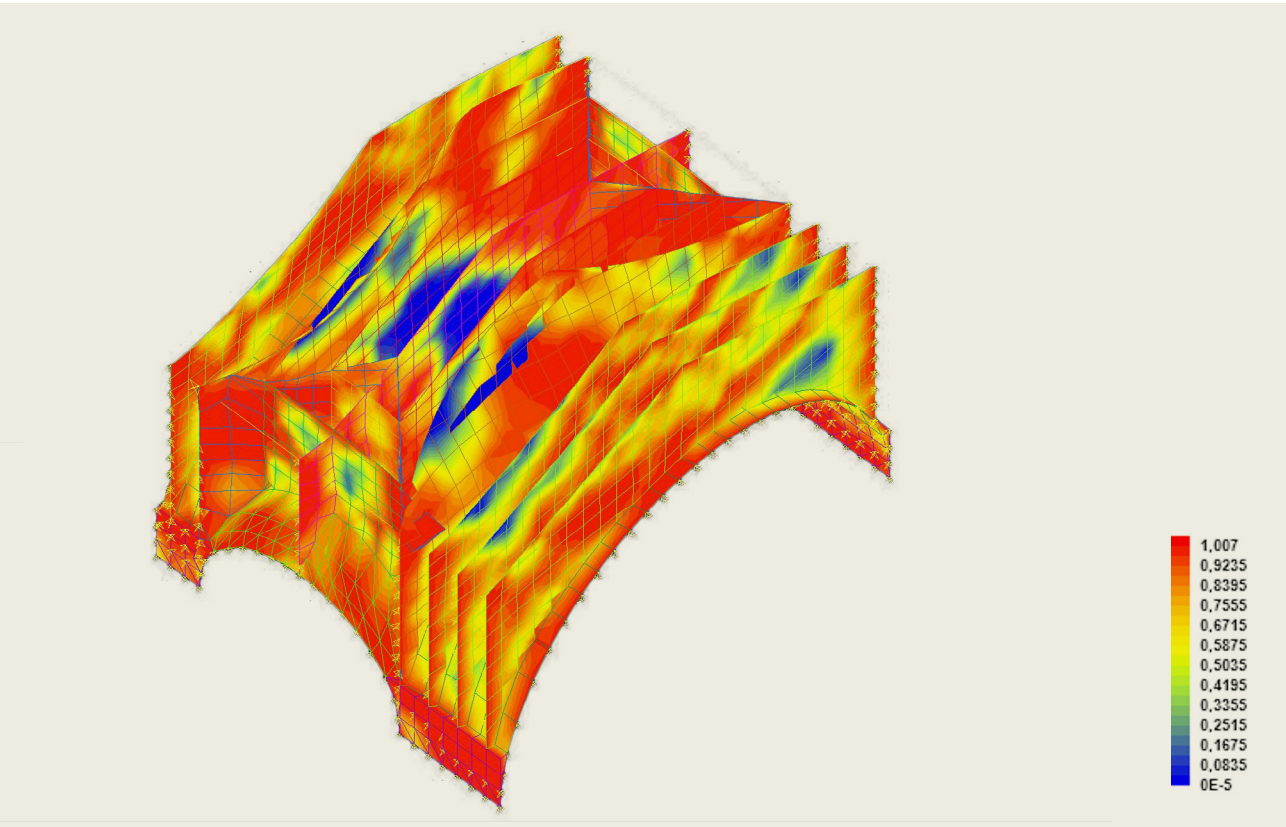
bóveda de cañón de medio punto con lunetos

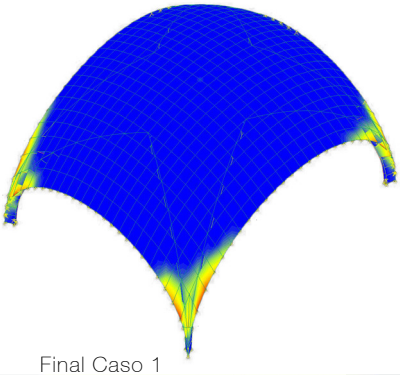
relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

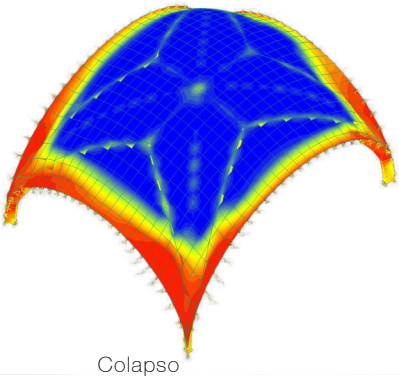
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
CL_01	15	1,0403	23	0,0444	28	-0,0018	4,44	0,07
CL_02	16	1,0013	18	0,0517	23	-0,0129	5,17	0,08
CL_03	11	1,01	18	0,0981	50	0,0167	9,81	0,15
CL_04	**21**	**1,019**	**28**	**0,1224**	**30**	**-161565**	**12,24**	**0,18**





Final Caso 1



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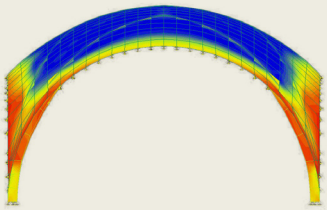
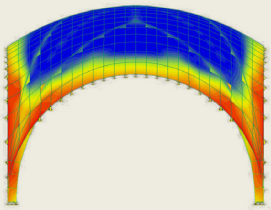
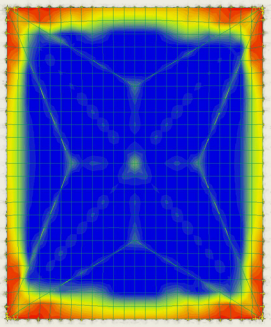






Caso 2. Carga máxima

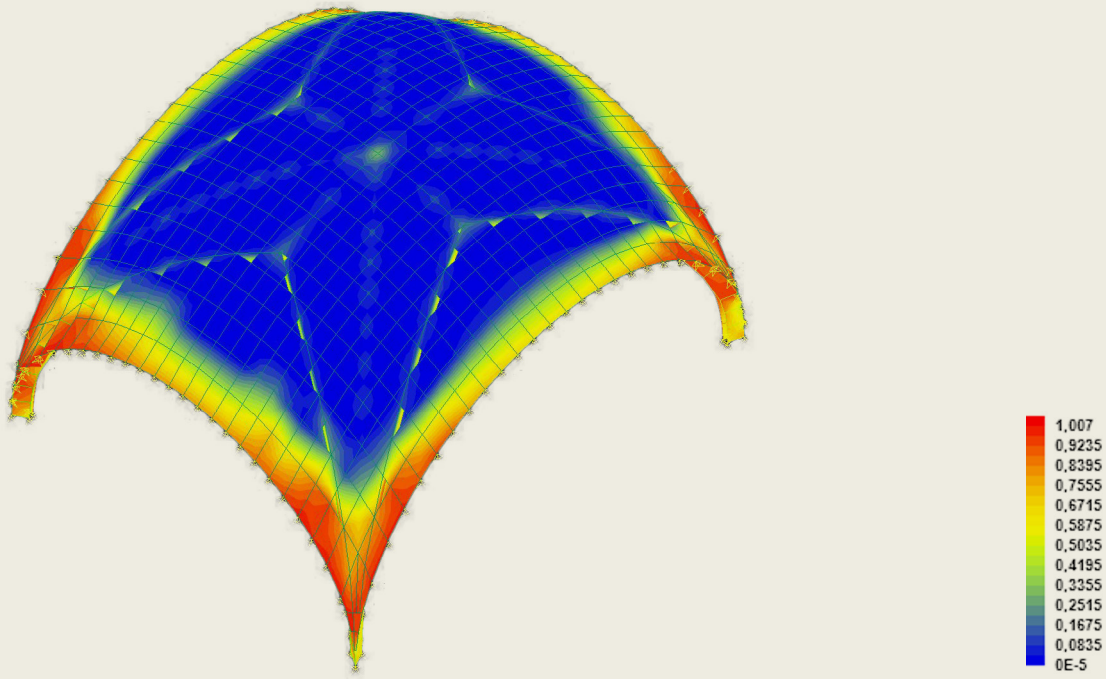
bóveda baída estrellada, nervaturas de ladrillo

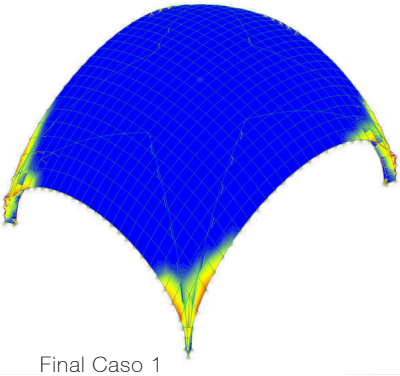
sin relleno de senos ni rigidizadores

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

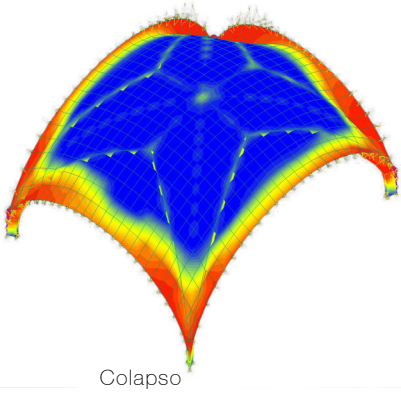
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNI_01	**6**	**1,1745**	**24**	**0,6593**	**60**	**0,6464**	**65,93**	**0,98**
BNI_02	6	1,1738	22	0,6618	60	0,6369	66,18	0,98
BNI_03	6	1,1623	19	0,6309	30	NeuN	63,09	0,94
BNI_04	6	1,07	23	0,7628	57	NeuN	76,28	1,13





Final Caso 1



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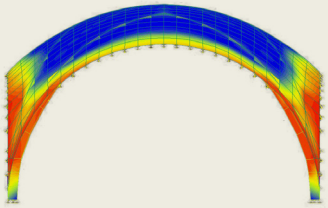
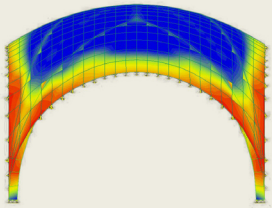
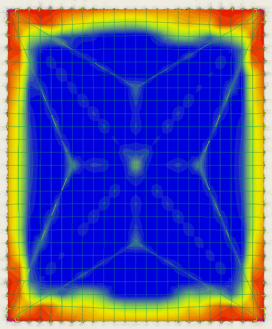






Caso 2. Carga máxima

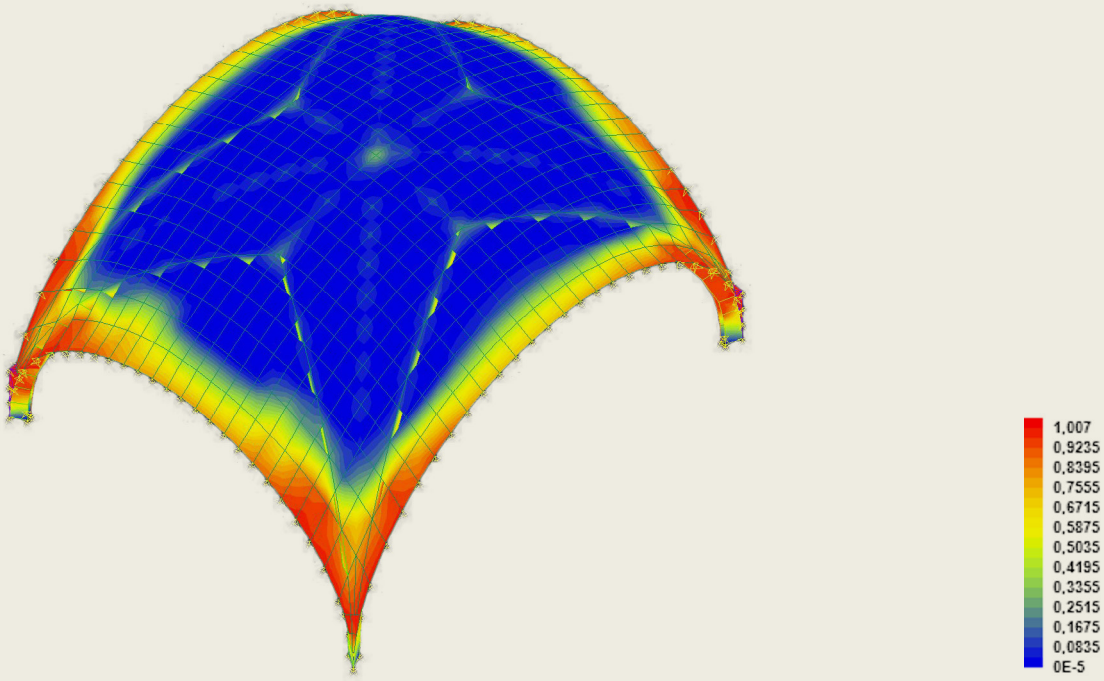
bóveda baída estrellada, nervaturas de ladrillo

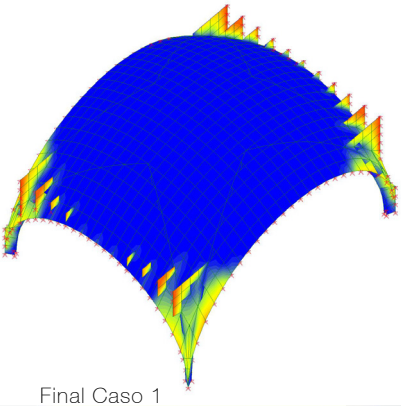
relleno de senos hasta 1/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

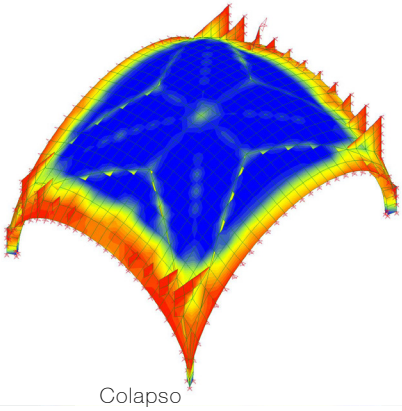
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNI_01	6	1,1745	24	0,6593	60	0,6464	65,93	0,98
BNI_02	**6**	**1,1738**	**22**	**0,6618**	**60**	**0,6369**	**66,18**	**0,98**
BNI_03	6	1,1623	19	0,6309	30	NeuN	63,09	0,94
BNI_04	6	1,07	23	0,7628	57	NeuN	76,28	1,13





Final Caso 1



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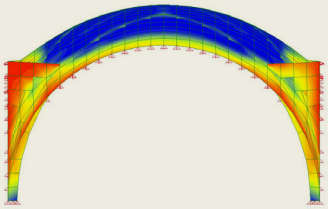
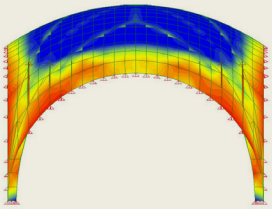
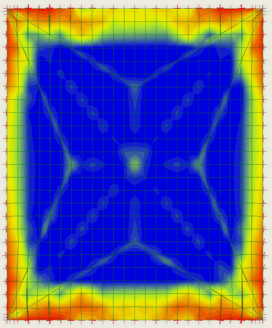






Caso 2. Carga máxima

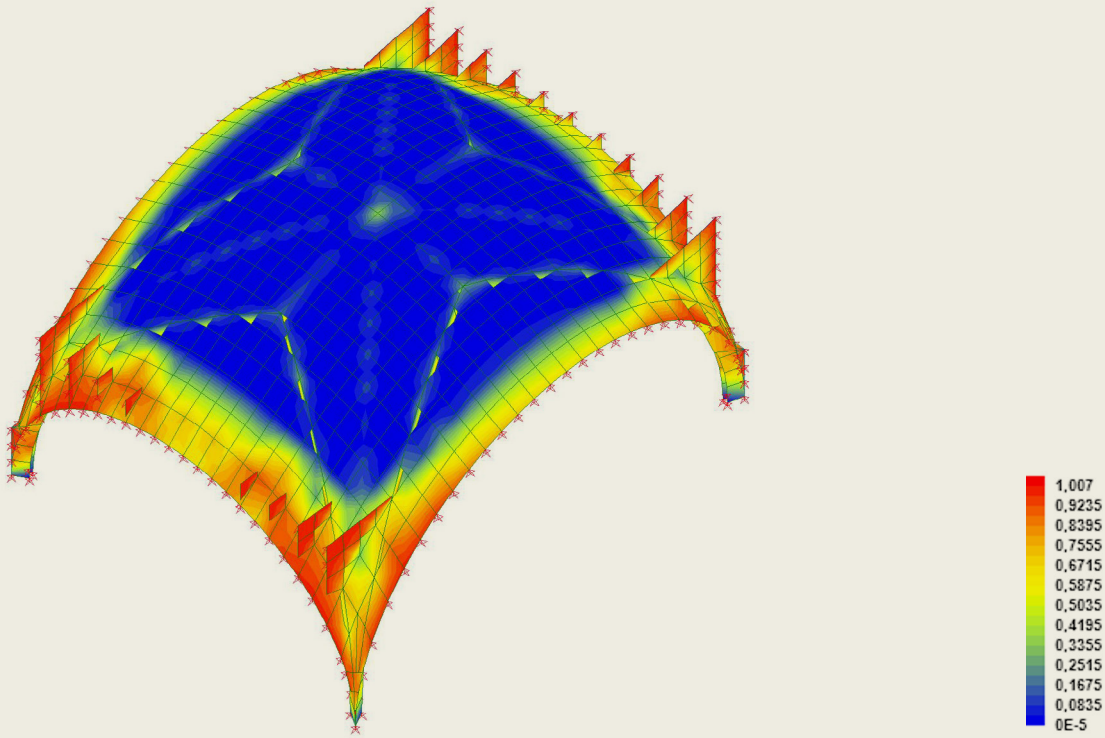
bóveda baída estrellada, nervaturas de ladrillo

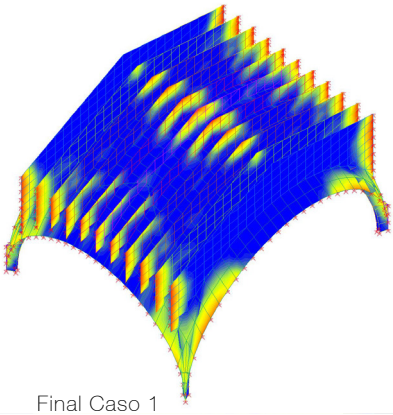
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

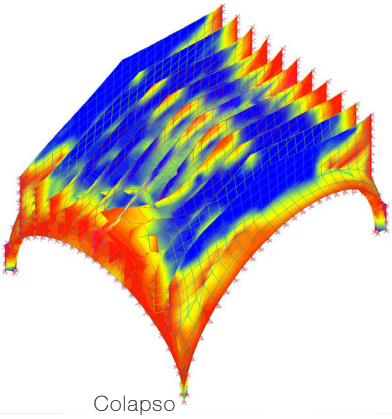
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNI_01	6	1,1745	24	0,6593	60	0,6464	65,93	0,98
BNI_02	6	1,1738	22	0,6618	60	0,6369	66,18	0,98
BNI_03	**6**	**1,1623**	**19**	**0,6309**	**30**	**NeuN**	**63,09**	**0,94**
BNI_04	6	1,07	23	0,7628	57	NeuN	76,28	1,13





Final Caso 1



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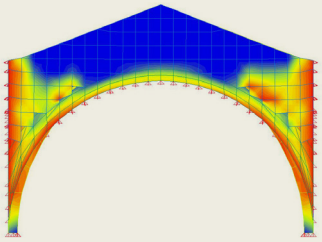
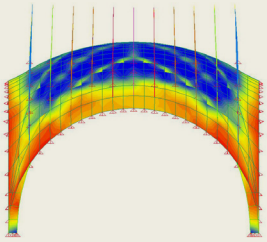
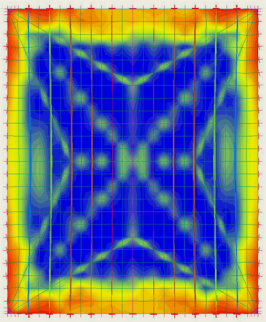






Caso 2. Carga máxima

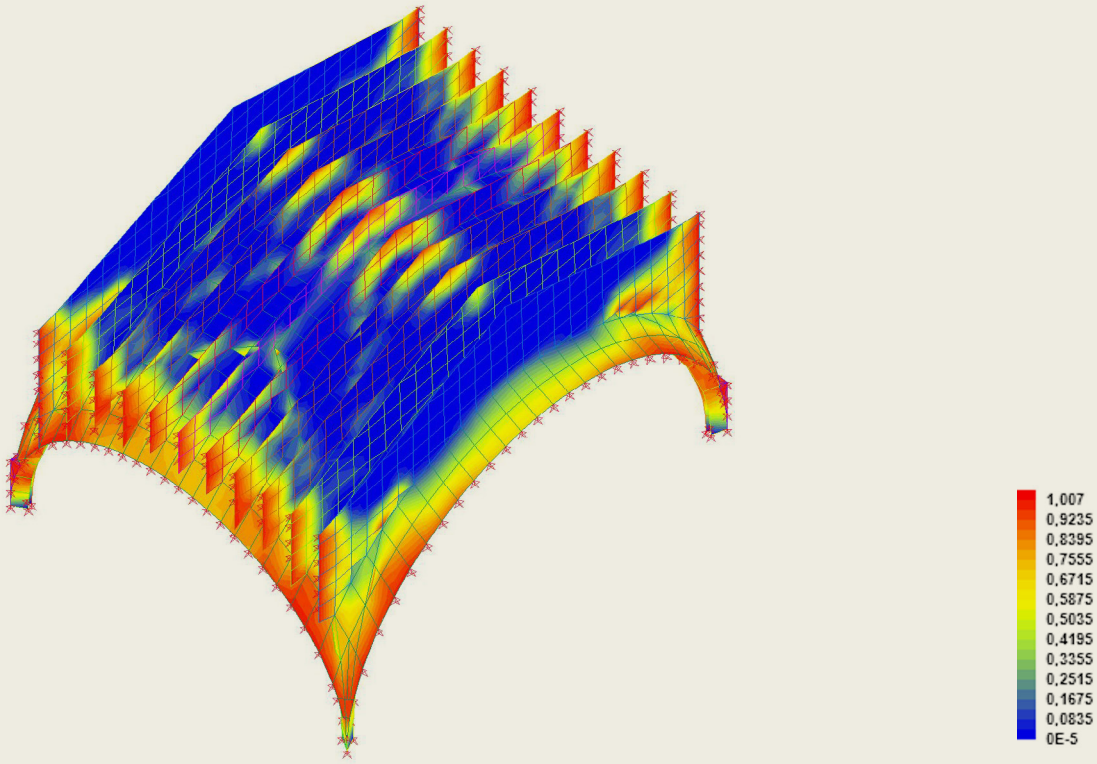
bóveda baída estrellada, nervaturas de ladrillo

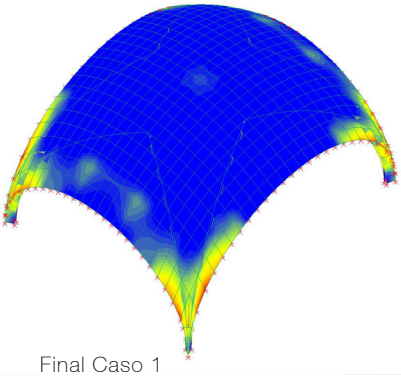
relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

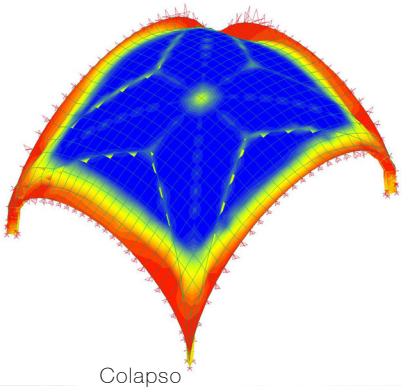
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNI_01	6	1,1745	24	0,6593	60	0,6464	65,93	0,98
BNI_02	6	1,1738	22	0,6618	60	0,6369	66,18	0,98
BNI_03	6	1,1623	19	0,6309	30	NeuN	63,09	0,94
BNI_04	**6**	**1,07**	**23**	**0,7628**	**57**	**NeuN**	**76,28**	**1,13**





Final Caso 1



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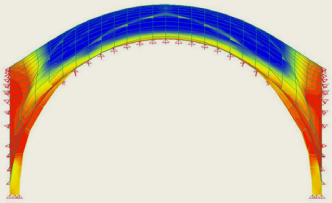
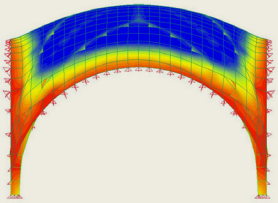
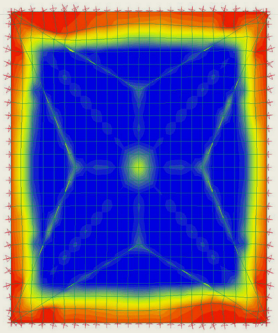






Caso 2. Carga máxima

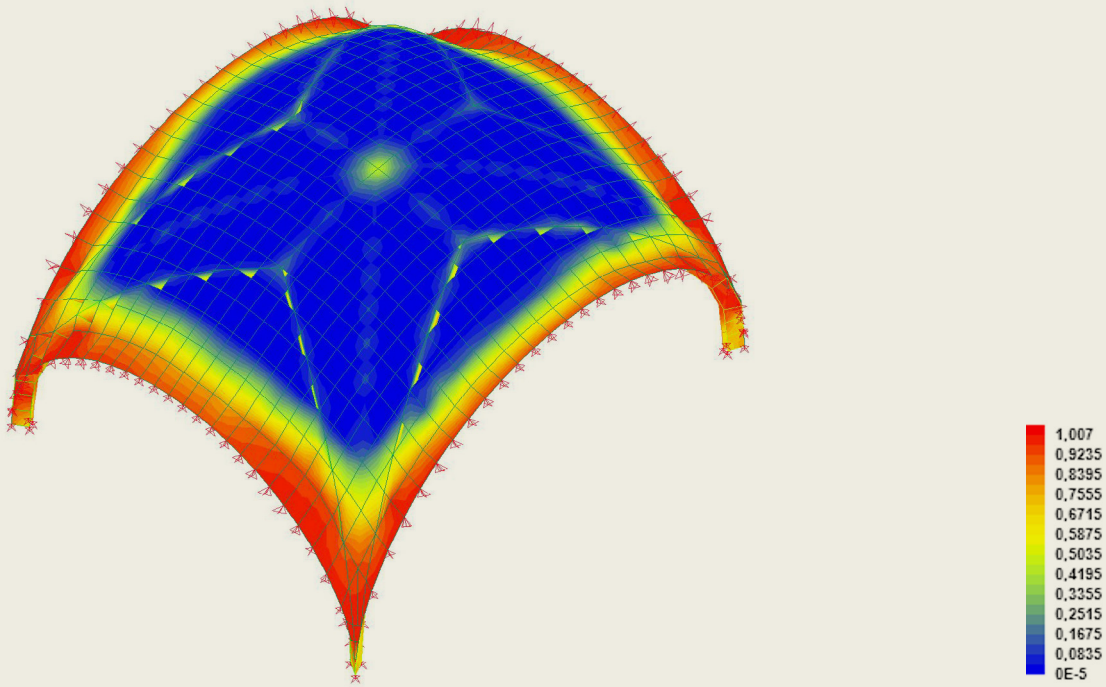
bóveda baída estrellada, nervaturas de piedra

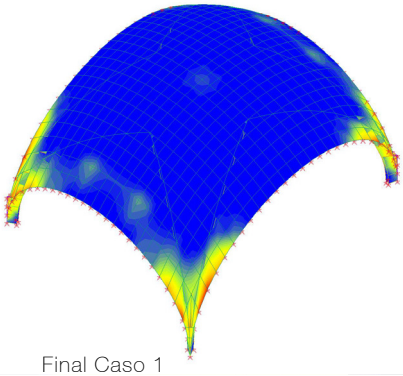
sin relleno o rigidizadores

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

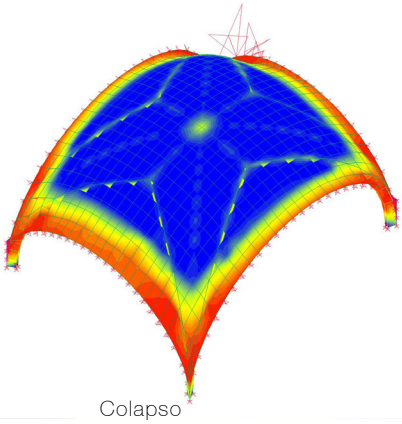
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNp_01	**6**	**1,1286**	**32**	**0,6496**	**60**	**0,6255**	**64,96**	**0,96**
BNp_02	6	1,1337	30	0,6434	52	-0,0209	64,34	0,95
BNp_03	6	1,294	17	0,6332	27	NeuN	63,32	0,94
BNp_04	6	1,0466	20	0,759	54	1,2941	75,9	1,13

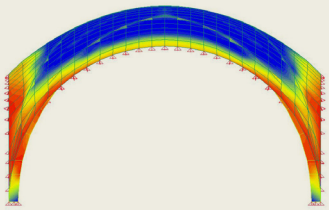


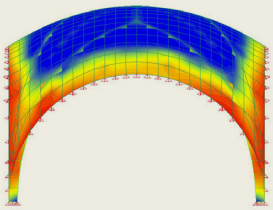


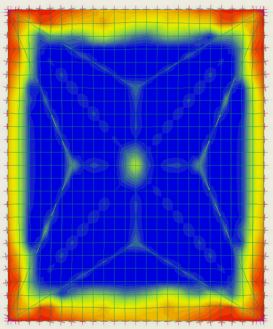
Final Caso 1



Colapso







Caso 2. Carga máxima

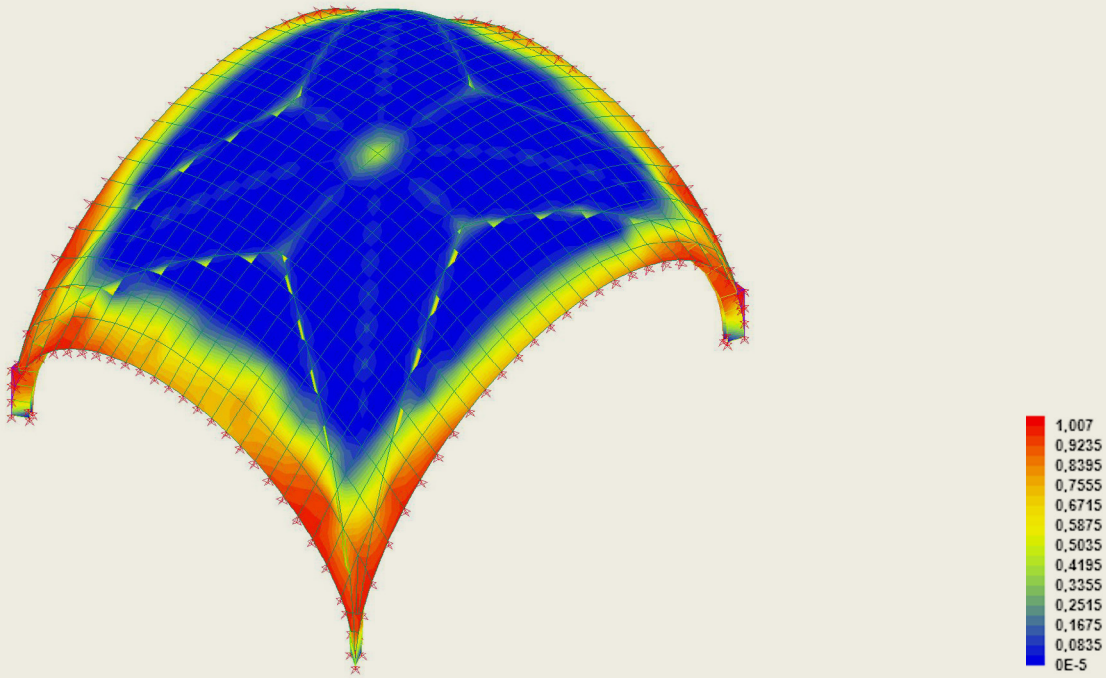
bóveda baída estrellada, nervaturas de piedra

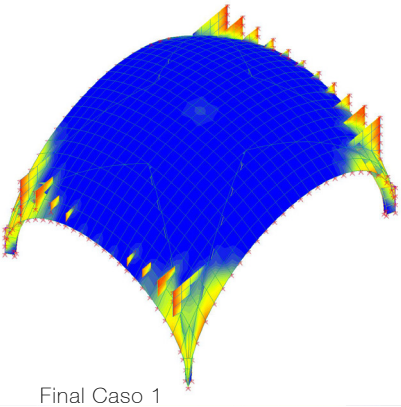
relleno de senos hasta 1/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

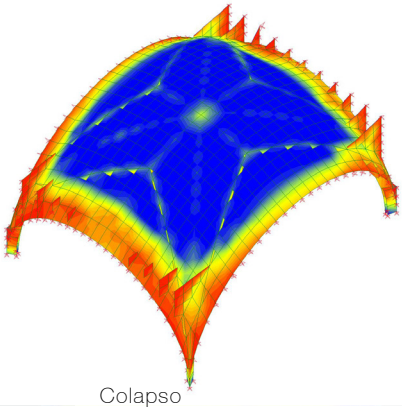
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNp_01	6	1,1286	32	0,6496	60	0,6255	64,96	0,96
BNp_02	**6**	**1,1337**	**30**	**0,6434**	**52**	**-0,0209**	**64,34**	**0,95**
BNp_03	6	1,294	17	0,6332	27	NeuN	63,32	0,94
BNp_04	6	1,0466	20	0,759	54	1,2941	75,9	1,13

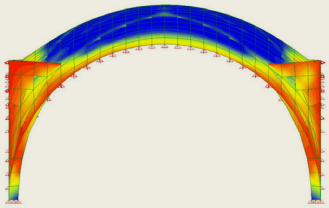


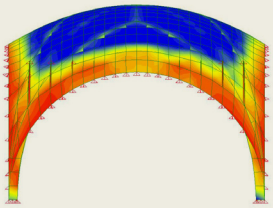


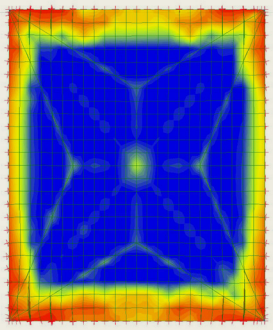
Final Caso 1



Colapso







Caso 2. Carga máxima

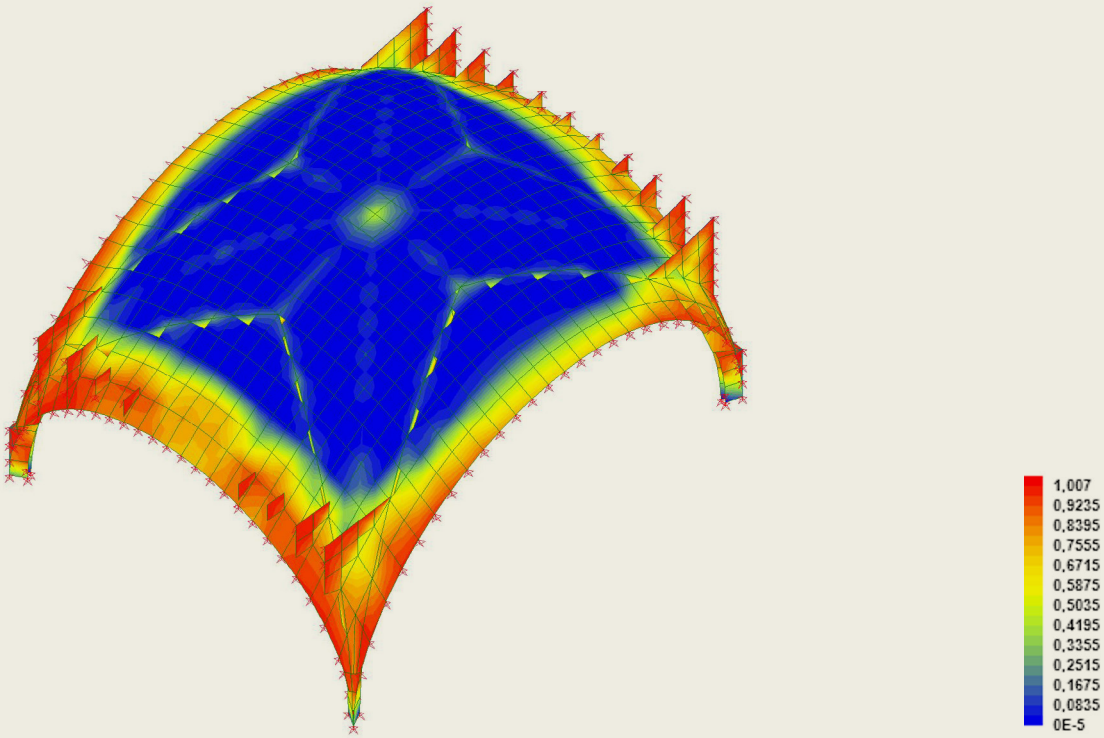
bóveda baída estrellada, nervaturas de piedra

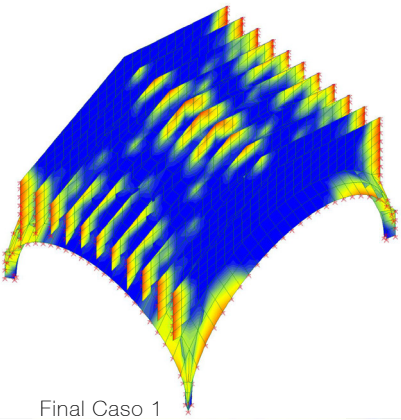
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

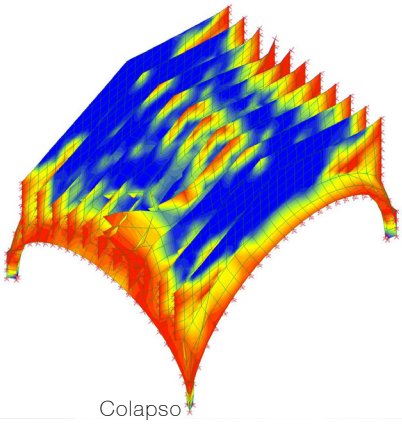
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNp_01	6	1,1286	32	0,6496	60	0,6255	64,96	0,96
BNp_02	6	1,1337	30	0,6434	52	-0,0209	64,34	0,95
BNp_03	**6**	**1,294**	**17**	**0,6332**	**27**	**NeuN**	**63,32**	**0,94**
BNp_04	6	1,0466	20	0,759	54	1,2941	75,9	1,13





Final Caso 1



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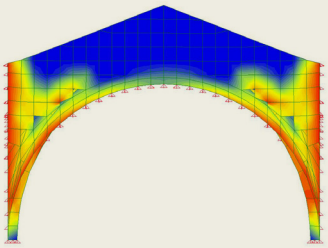
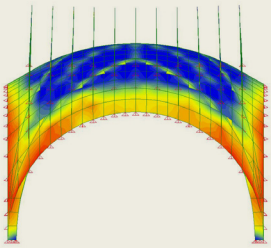
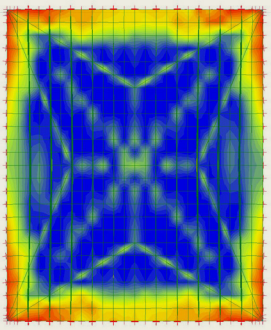






Caso 2. Carga máxima

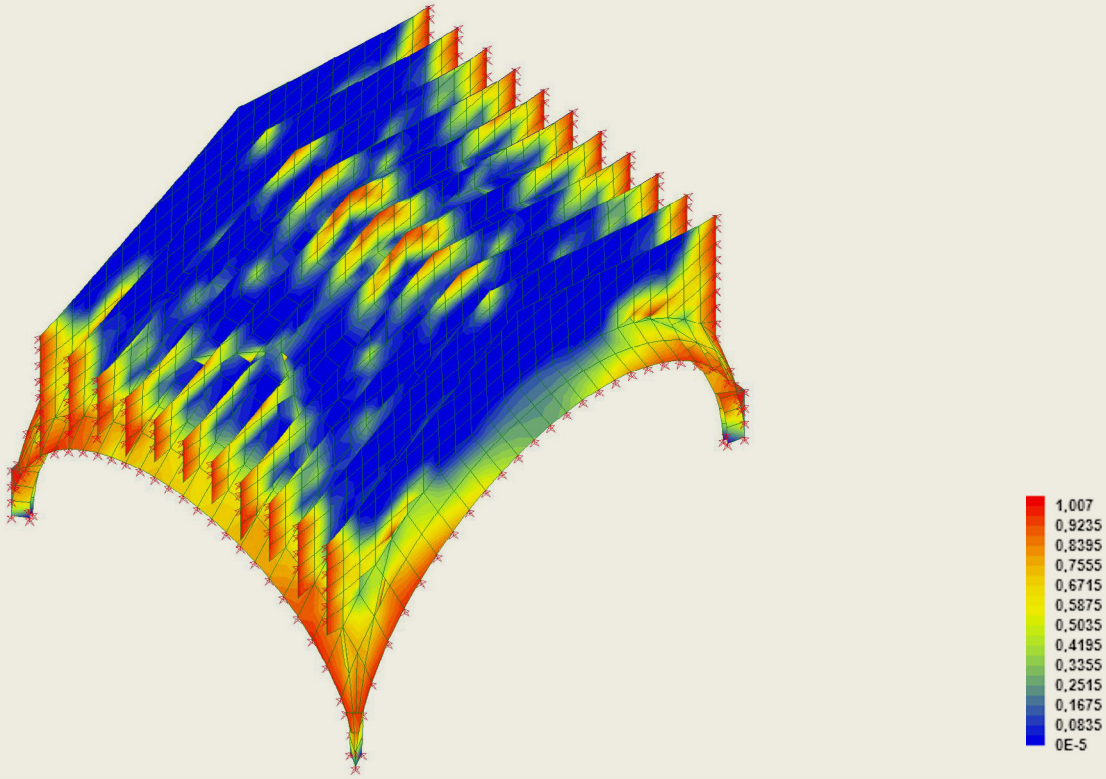
bóveda baída estrellada, nervaturas de piedra

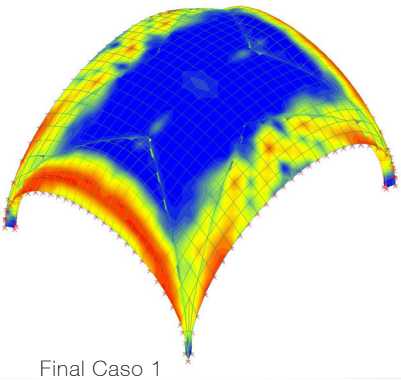
relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

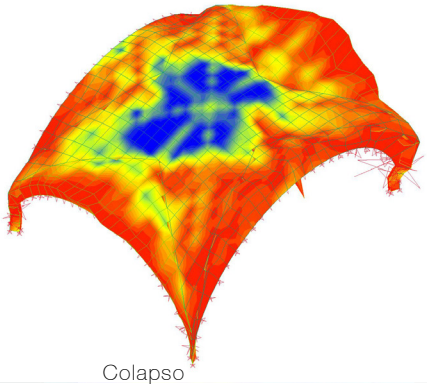
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
BNp_01	6	1,1286	32	0,6496	60	0,6255	64,96	0,96
BNp_02	6	1,1337	30	0,6434	52	-0,0209	64,34	0,95
BNp_03	6	1,294	17	0,6332	27	NeuN	63,32	0,94
BNp_04	**6**	**1,0466**	**20**	**0,759**	**54**	**1,2941**	**75,9**	**1,13**





Final Caso 1



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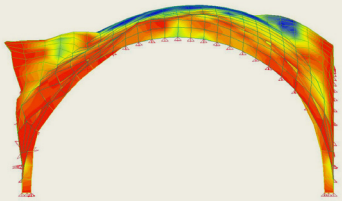
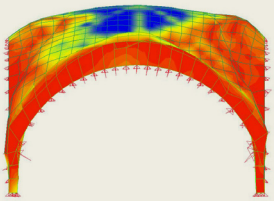
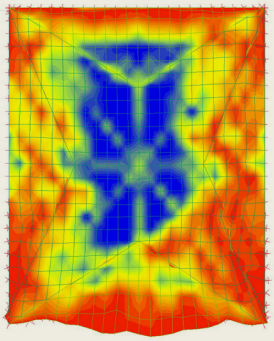






Caso 2. Carga máxima

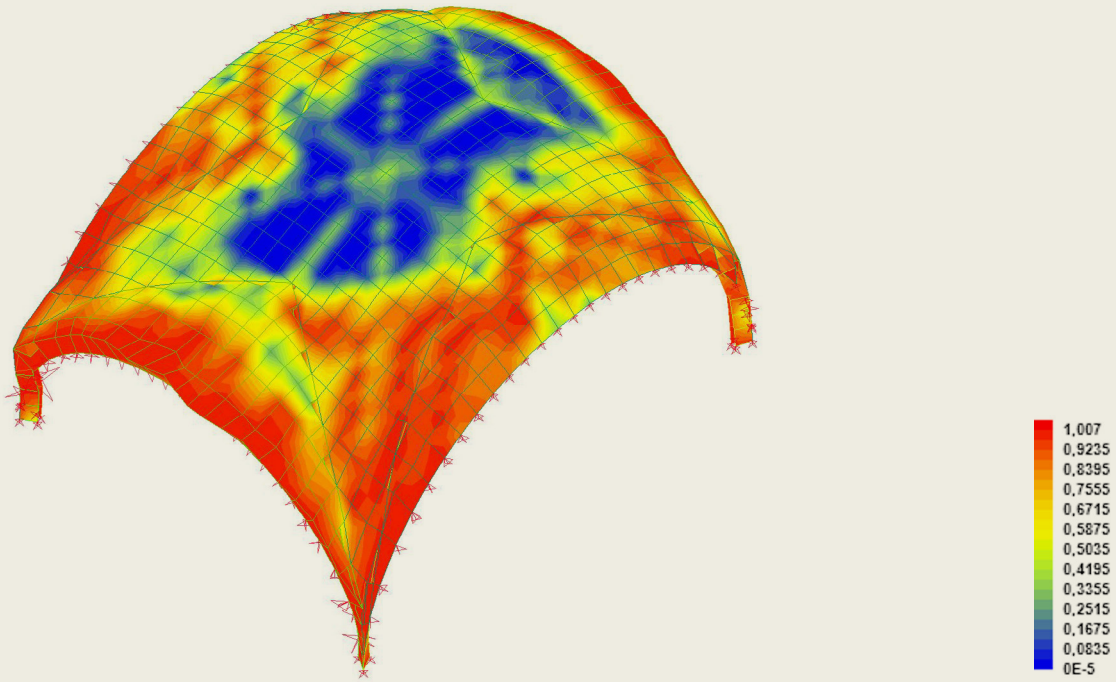
bóveda de crucería, nervaturas de piedra, calota con pliegues

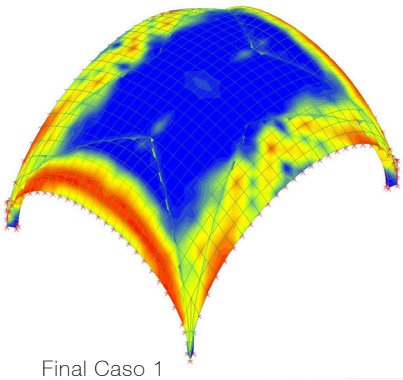
sin relleno o rigidizadores

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

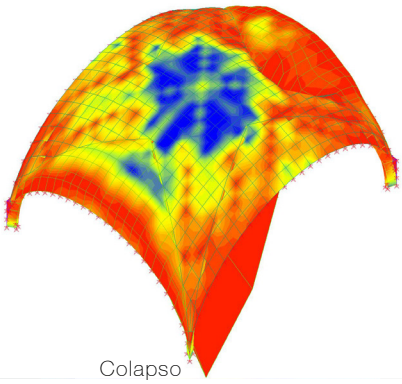
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
Np_01	**10**	**1,0464**	**17**	**0,1632**	**47**	**0,11**	**16,32**	**0,24**
Np_02	10	1,0464	20	0,2042	35	-0,0162	20,42	0,30
Np_03	7	1,1104	61	0,397	27	NeuN	39,7	0,59
Np_03	7	10238	24	0,5224	28	NeuN	52,24	0,78





Final Caso 1



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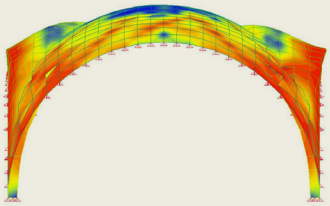
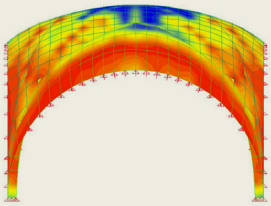
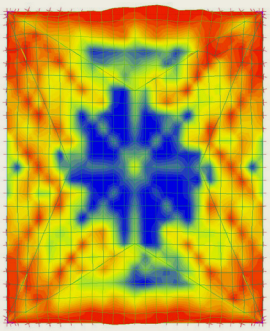






Caso 2. Carga máxima

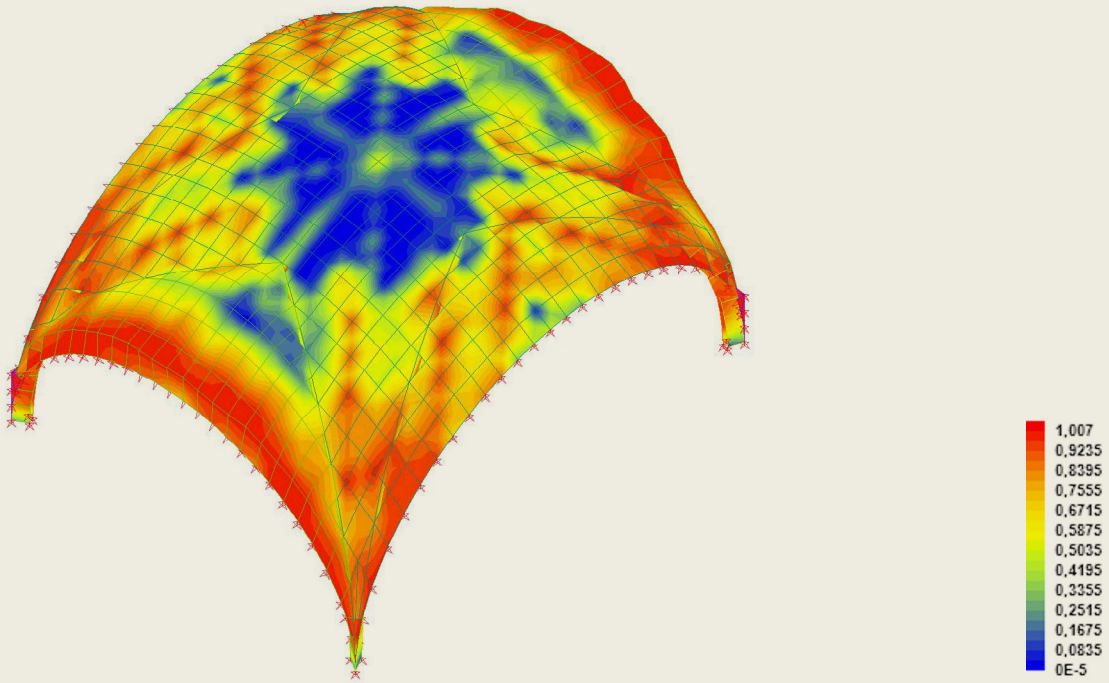
bóveda de crucería, nervaturas de piedra, calota con pliegues

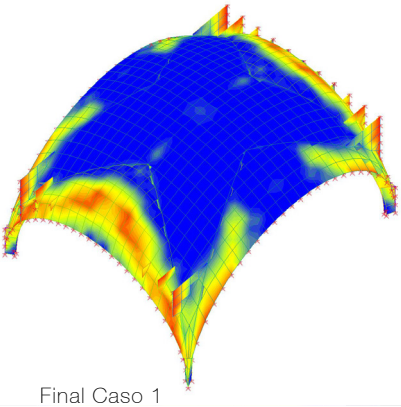
relleno de senos hasta 1/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

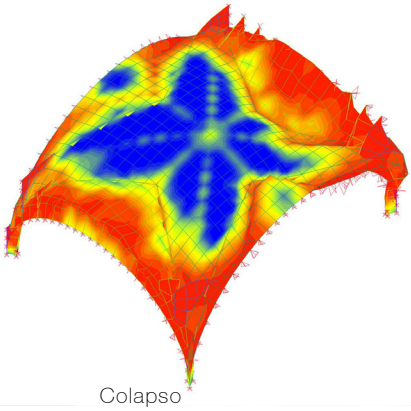
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
Np_01	10	1,0464	17	0,1632	47	0,11	16,32	0,24
Np_02	**10**	**1,0464**	**20**	**0,2042**	**35**	**-0,0162**	**20,42**	**0,30**
Np_03	7	1,1104	61	0,397	27	NeuN	39,7	0,59
Np_03	7	10238	24	0,5224	28	NeuN	52,24	0,78

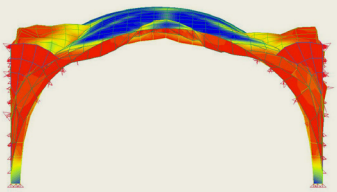


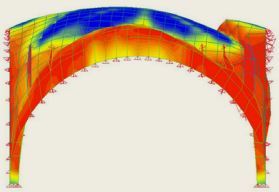


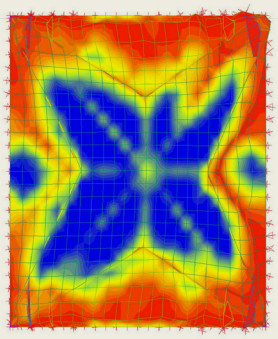
Final Caso 1



Colapso







Caso 2. Carga máxima

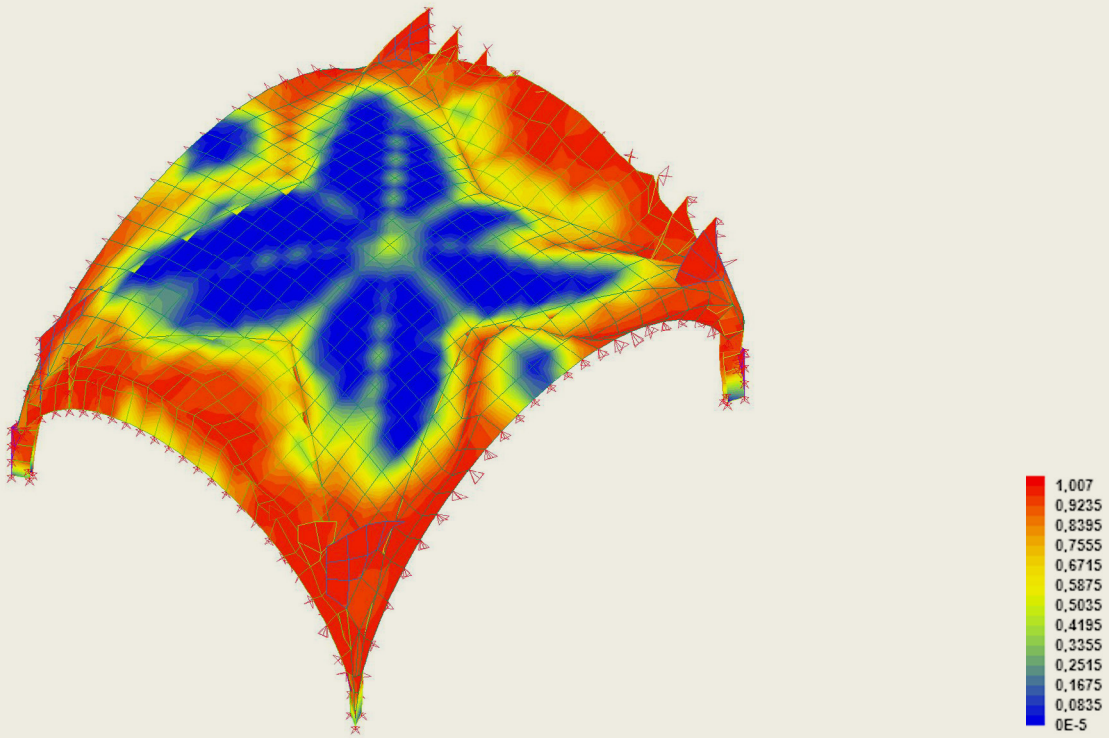
bóveda de crucería, nervaturas de piedra, calota con pliegues

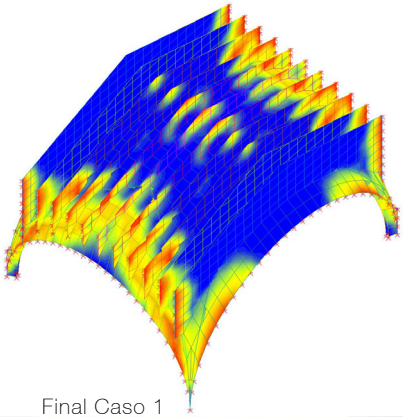
relleno de senos hasta 1/3 de h + tabiquillos hasta 2/3 de h

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

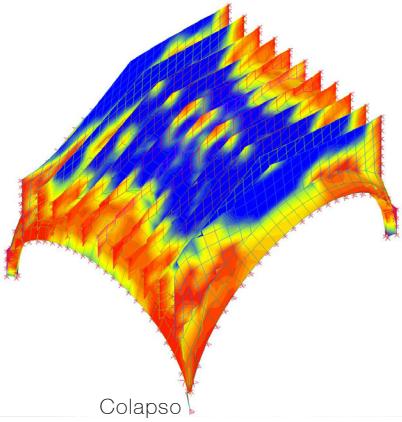
materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
Np_01	10	1,0464	17	0,1632	47	0,11	16,32	0,24
Np_02	10	1,0464	20	0,2042	35	-0,0162	20,42	0,30
Np_03	**7**	**1,1104**	**61**	**0,397**	**27**	**NeuN**	**39,7**	**0,59**
Np_03	7	10238	24	0,5224	28	NeuN	52,24	0,78





Final Caso 1



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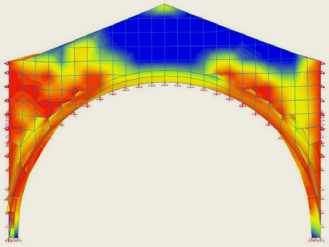
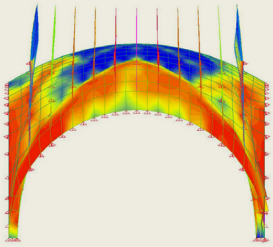
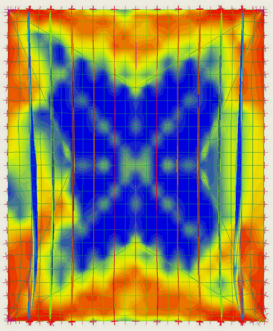




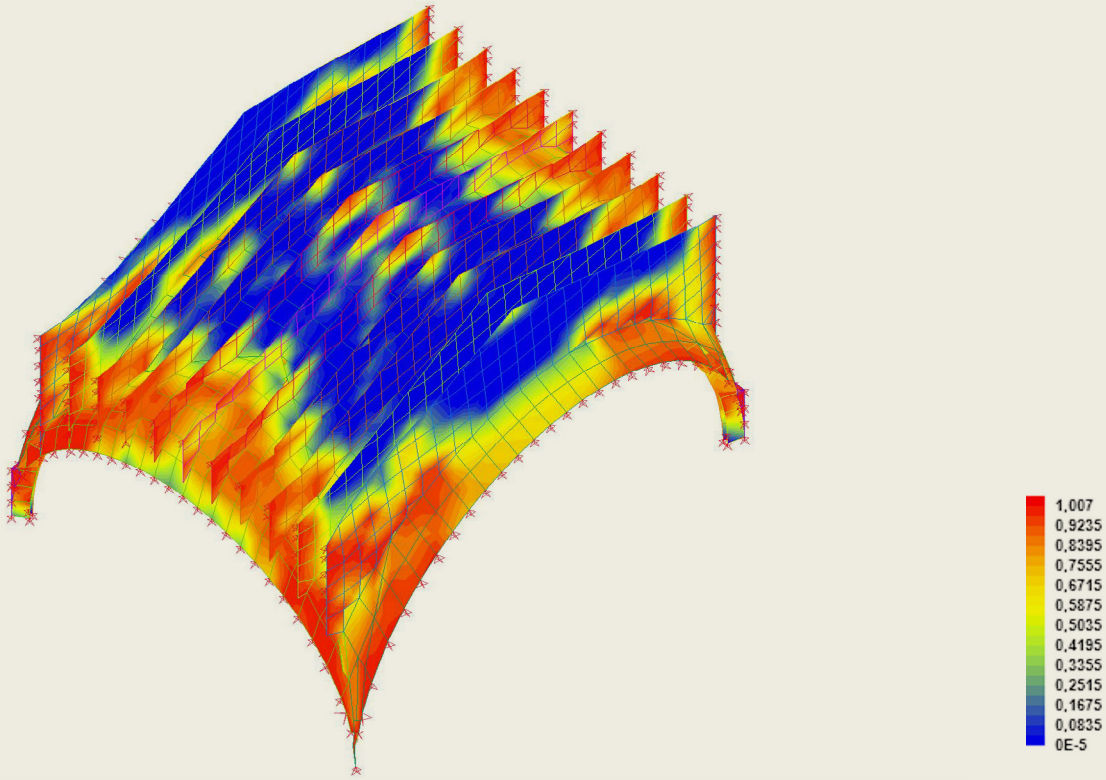


Caso 2. Carga máxima

bóveda de crucería, nervaturas de piedra, calota con pliegues

relleno de senos hasta 1/3 de h + tabiquillos hasta cubierta

combinaciones	H1	H7	H8
peso propio	pp		
sobrecarga		10	10
comb 1	1	0	0
comb 2	0	10	10

materiales	E [MPa]	Dens [Kg/m³]	ν	f- [MPa]	f+ [MPa]	G [J/m²]
ladrillo	7000	1600	0,2	3	0,005	20
piedra	1000	2300	0,2	5	0,005	20

	caso 1		caso 2		finaliza		carga de colapso kN/m²	uinitario
	paso	factor carga	paso	factor carga	paso	factor carga		
Np_01	10	1,0464	17	0,1632	47	0,11	16,32	0,24
Np_02	10	1,0464	20	0,2042	35	-0,0162	20,42	0,30
Np_03	7	1,1104	61	0,397	27	NeuN	39,7	0,59
Np_03	**7**	**10238**	**24**	**0,5224**	**28**	**NeuN**	**52,24**	**0,78**