

Giornata di Studio – Workshop

SAFE MONUMENTS

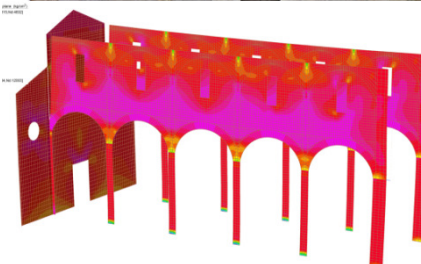
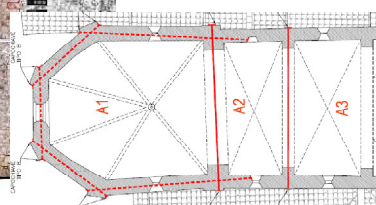
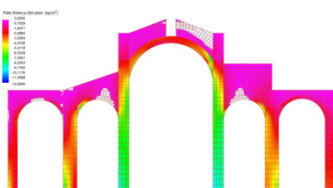
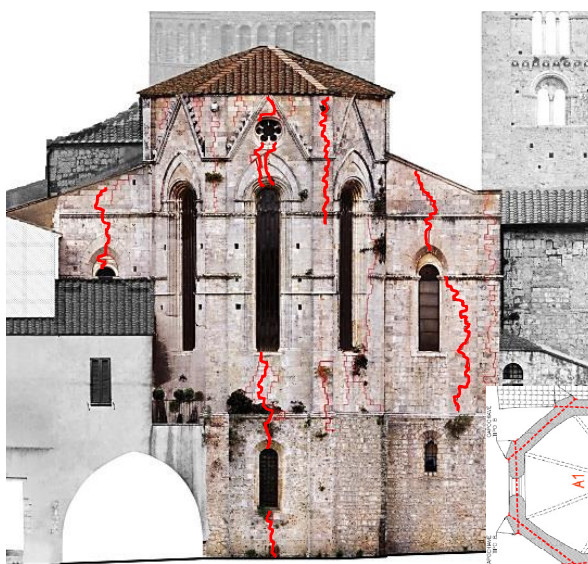
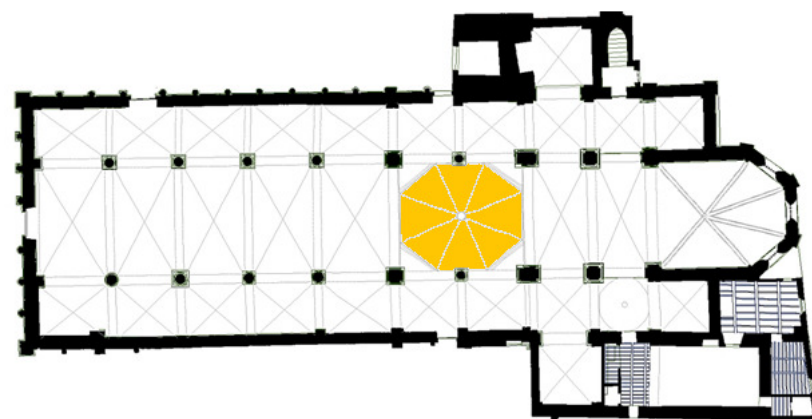
STUDIO DELLA CUPOLA DEL DUOMO DI MASSA MARITTIMA

G. Angelini, A. De Falco, M. Lucchesi, D. Pellegrini

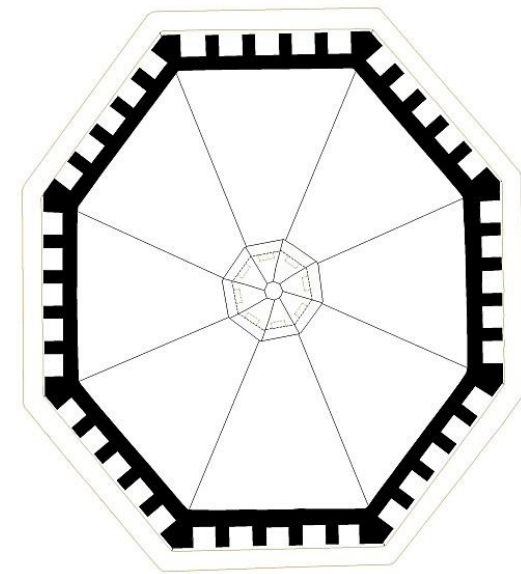
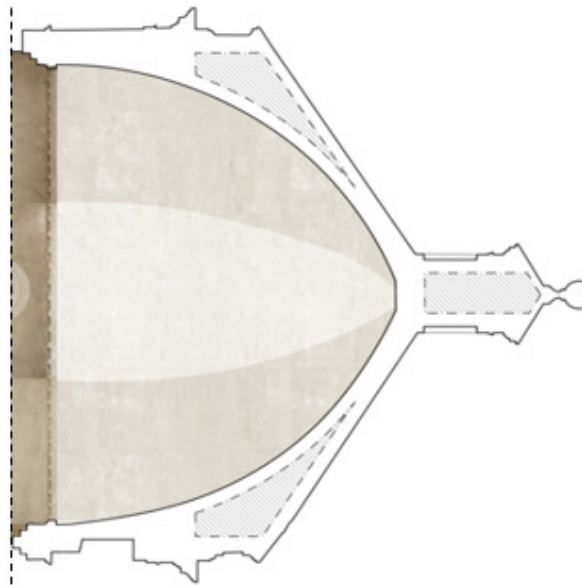
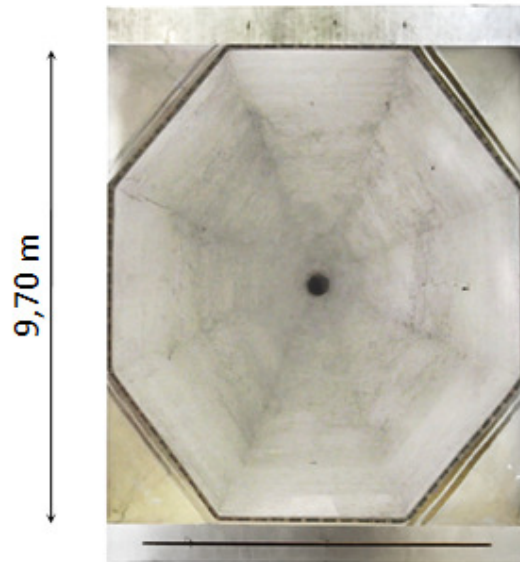
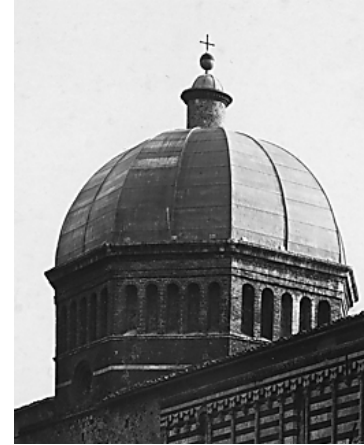
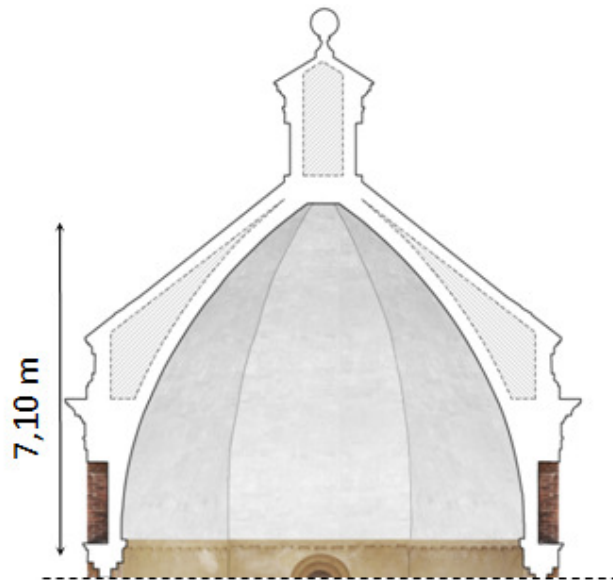
*Dipartimento di Ingegneria dell'Energia, dei Sistemi, del Territorio e delle
Costruzioni, Università di Pisa*

Dipartimento di Ingegneria Civile e Ambientale, Università di Firenze

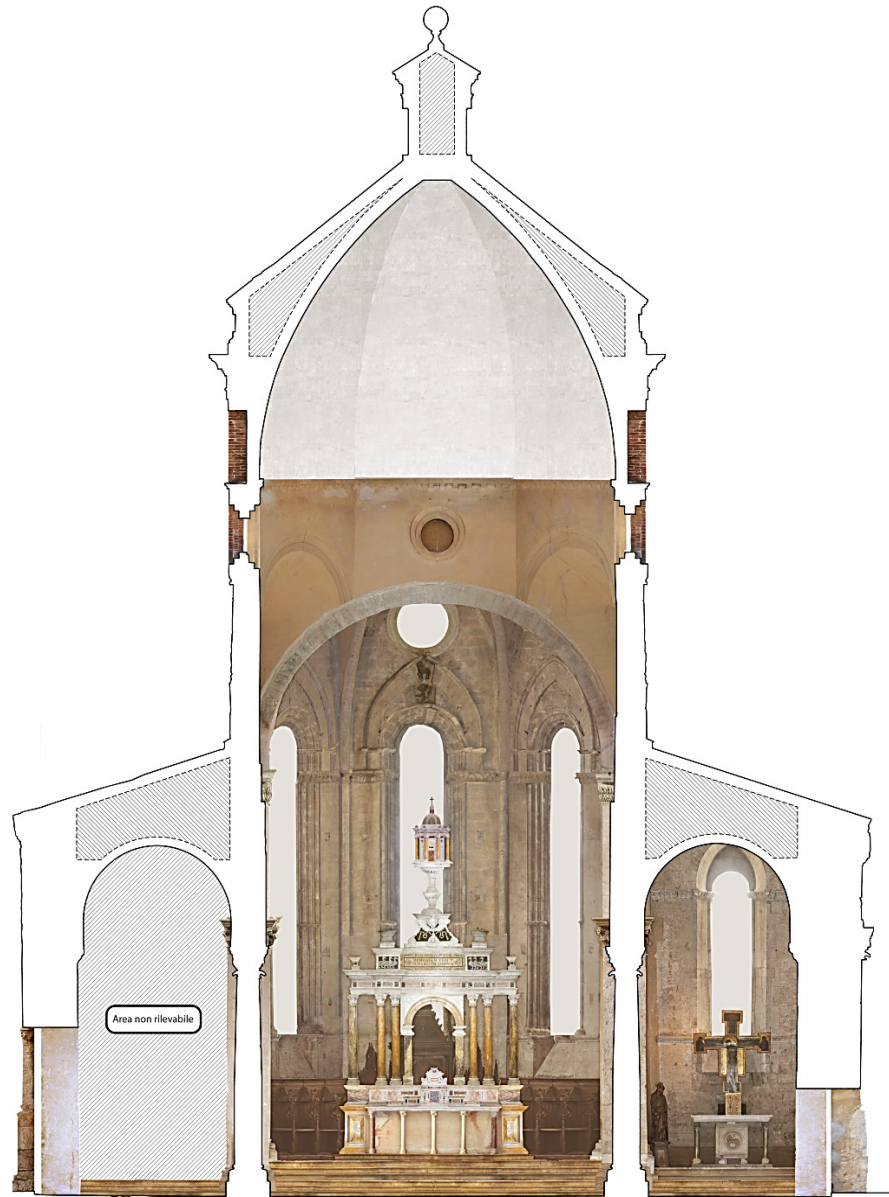
STUDIO DELLA CUPOLA DEL DUOMO DI MASSA MARITTIMA



STUDIO DELLA CUPOLA DEL DUOMO DI MASSA MARITTIMA



STUDIO DELLA CUPOLA DEL DUOMO DI MASSA MARITTIMA

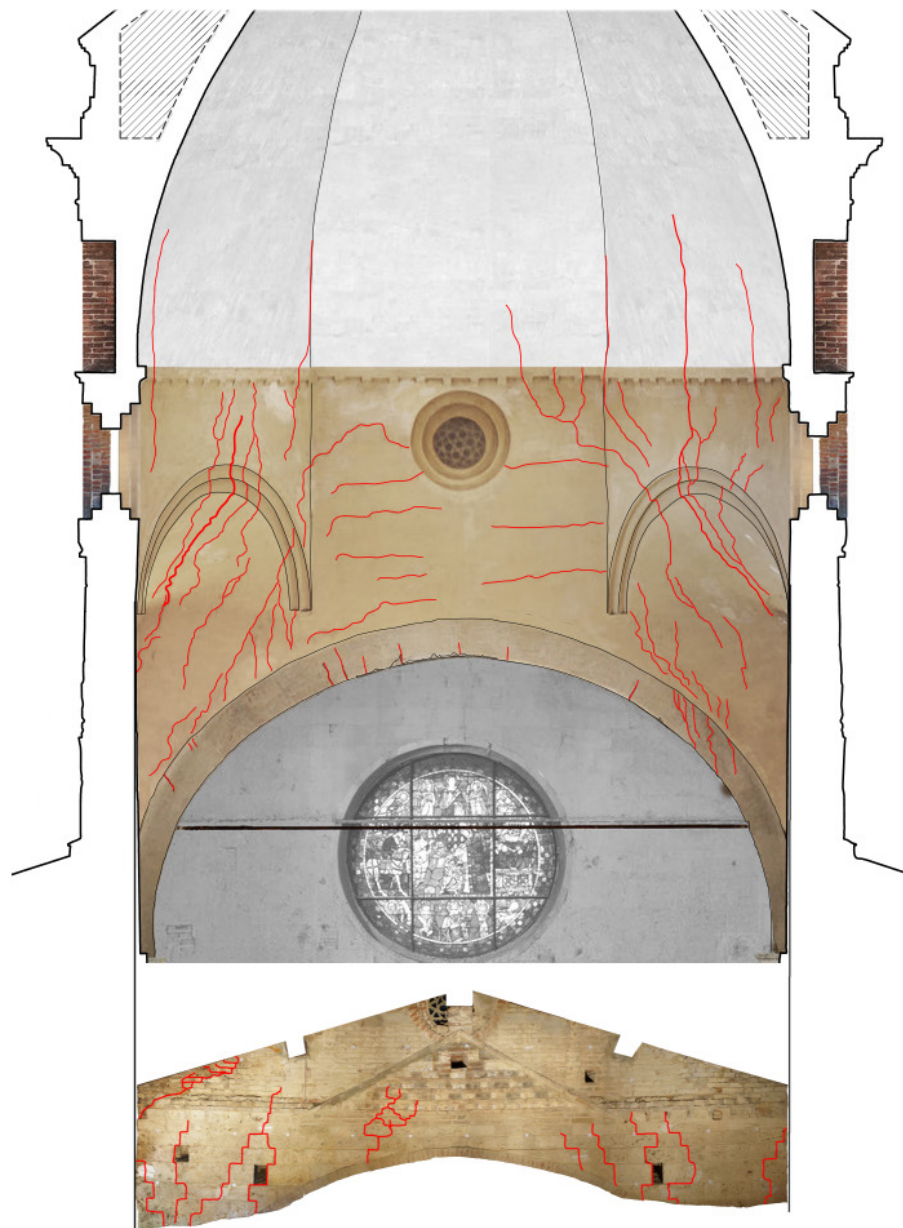


arco in pietra sul presbiterio

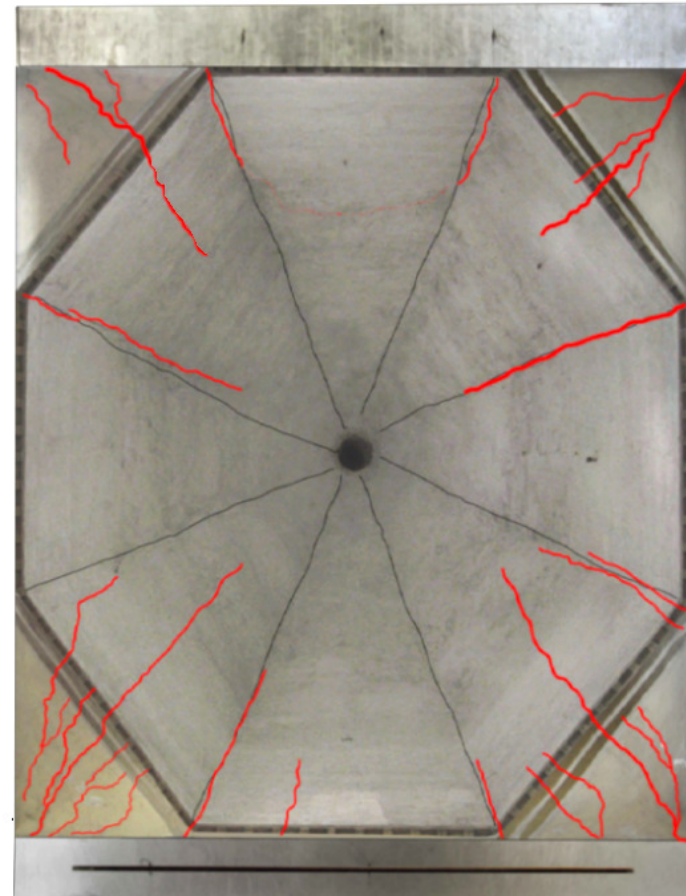


arco in mattoni dal lato navata centrale

IL QUADRO FESSURATIVO



IL QUADRO FESSURATIVO



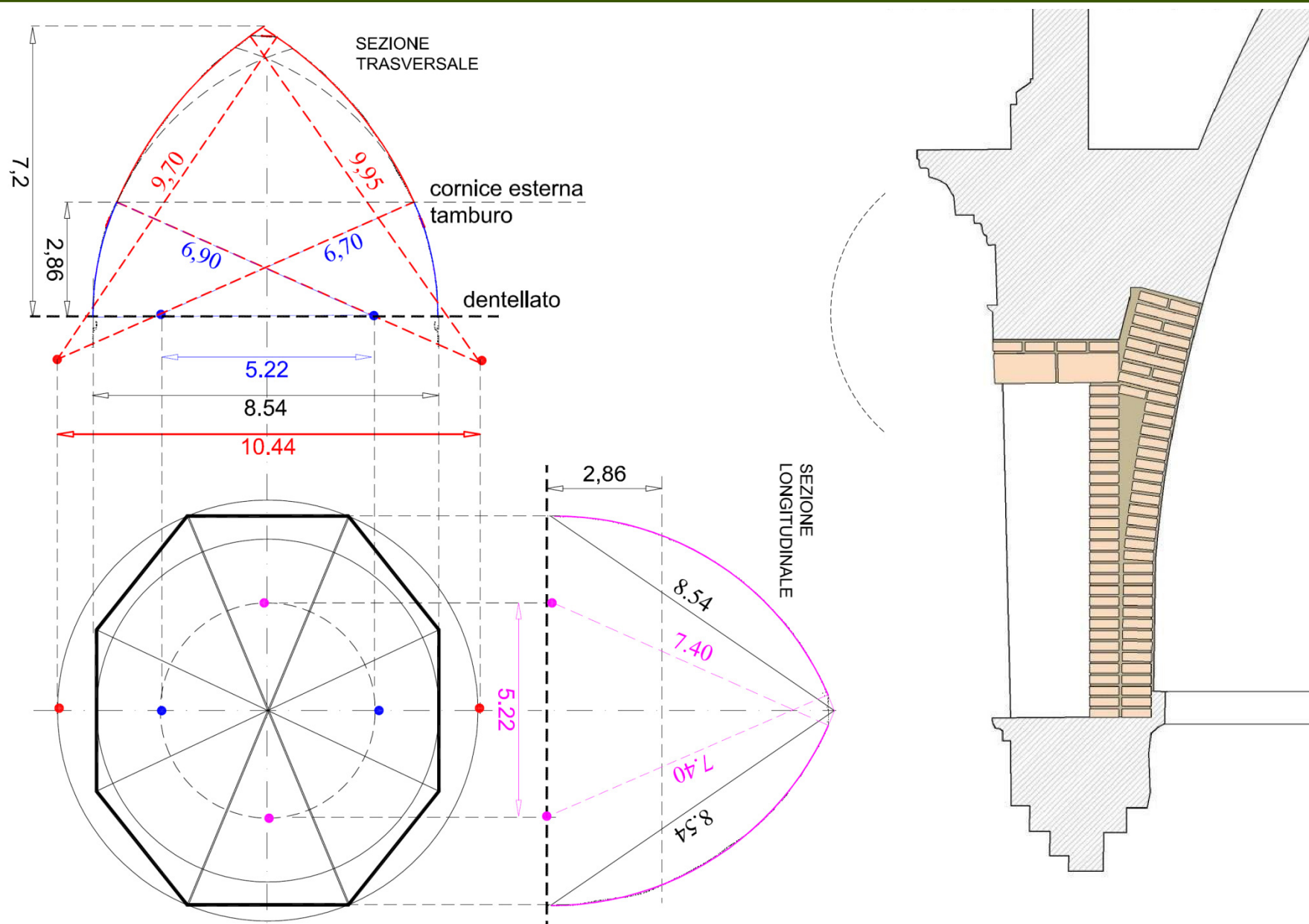
IL QUADRO FESSURATIVO



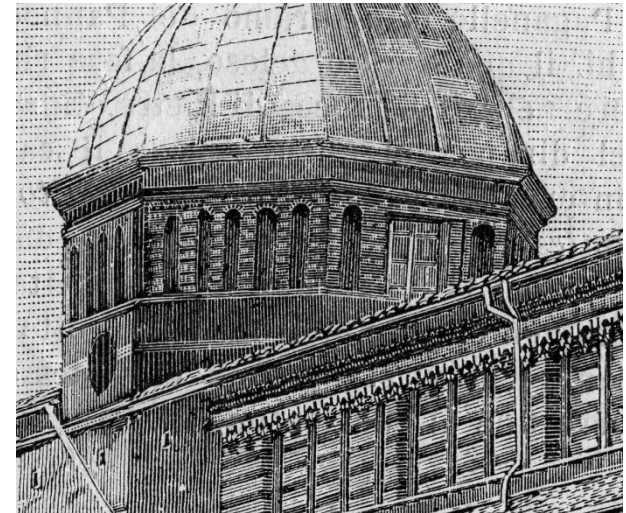
IL QUADRO FESSURATIVO



LA FORMA



LA STORIA



1463

1685...*franamento di una sua parte*

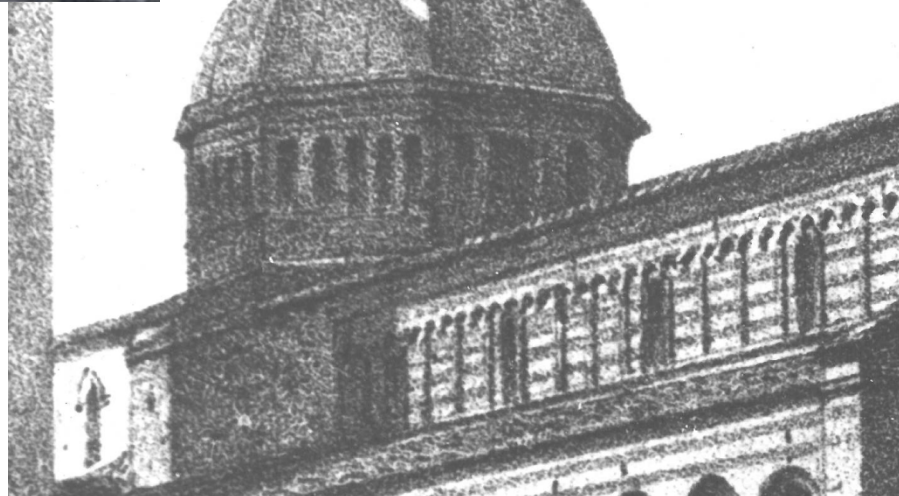
1925 caduta di un mattone sul pavimento

1938 riparazioni intradosso

1947 cuciture e iniezioni

1982 progetto di restauro

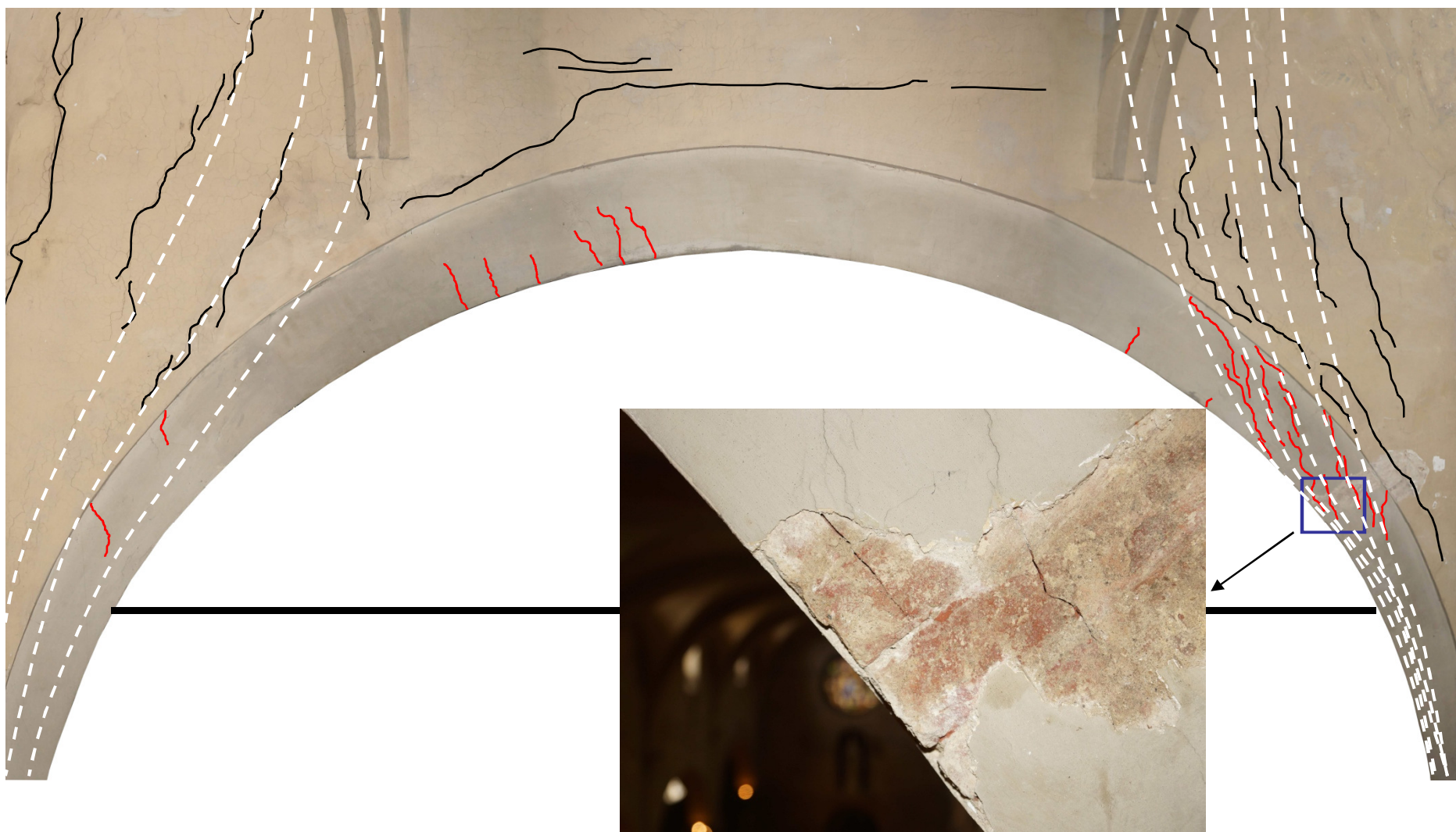
1991 progetto di consolidamento



I RILIEVI



LA DIAGNOSI DEL DISSESTO



LA DIAGNOSI DEL DISSESTO



LA DIAGNOSI DEL DISSESTO

La muratura della ghiera dell'arco in mattoni è estremamente danneggiata.

La catena, elemento indispensabile per l'equilibrio della struttura soprastante, mostra segni evidenti di ossidazione nella porzione murata. Inoltre, non essendo ispezionabile, non costituisce un presidio affidabile, qualunque sia l'entità del carico che la cimenta.

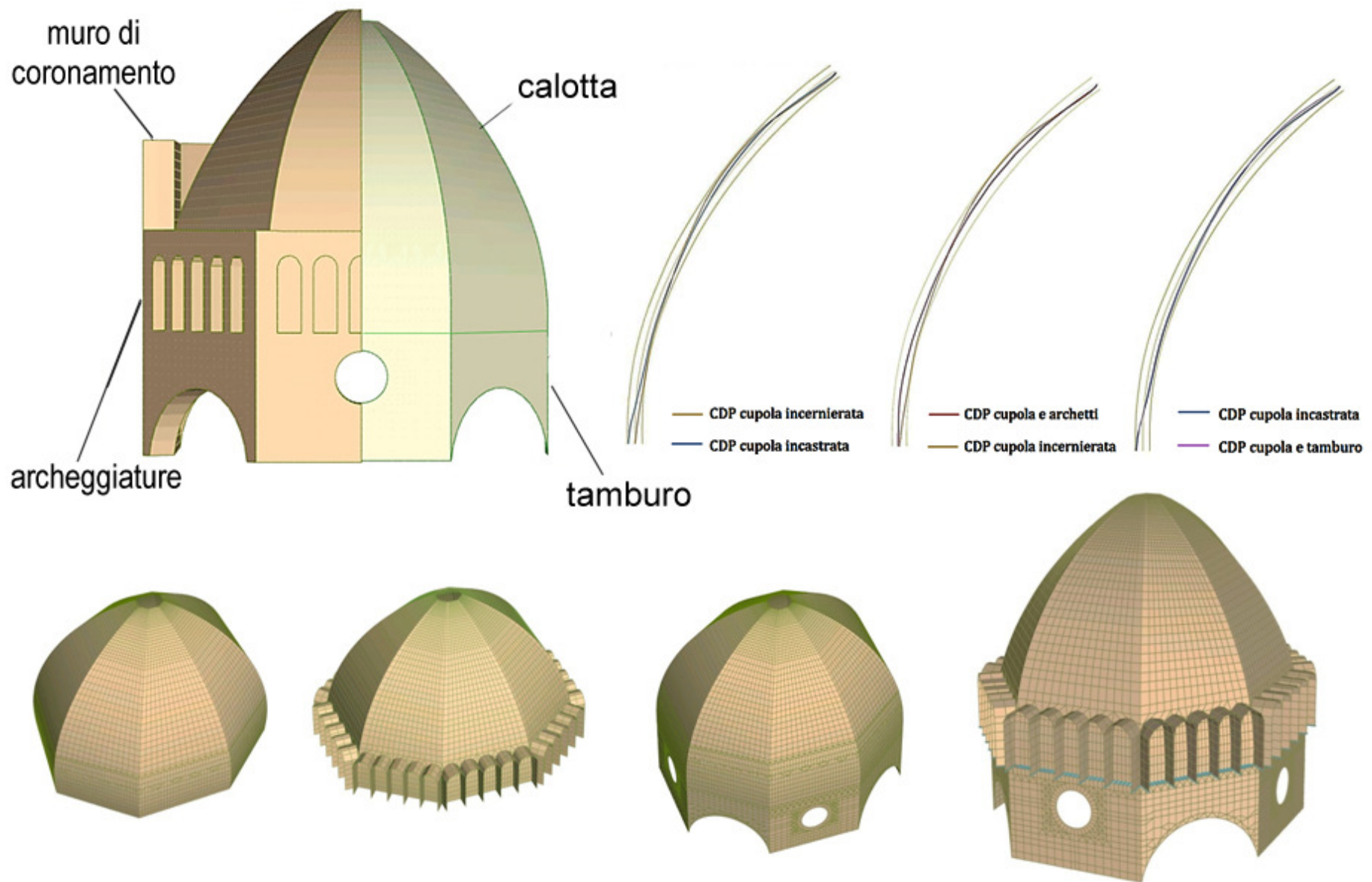
I movimenti delle lesioni mostrano che il dissesto è ancora in atto.



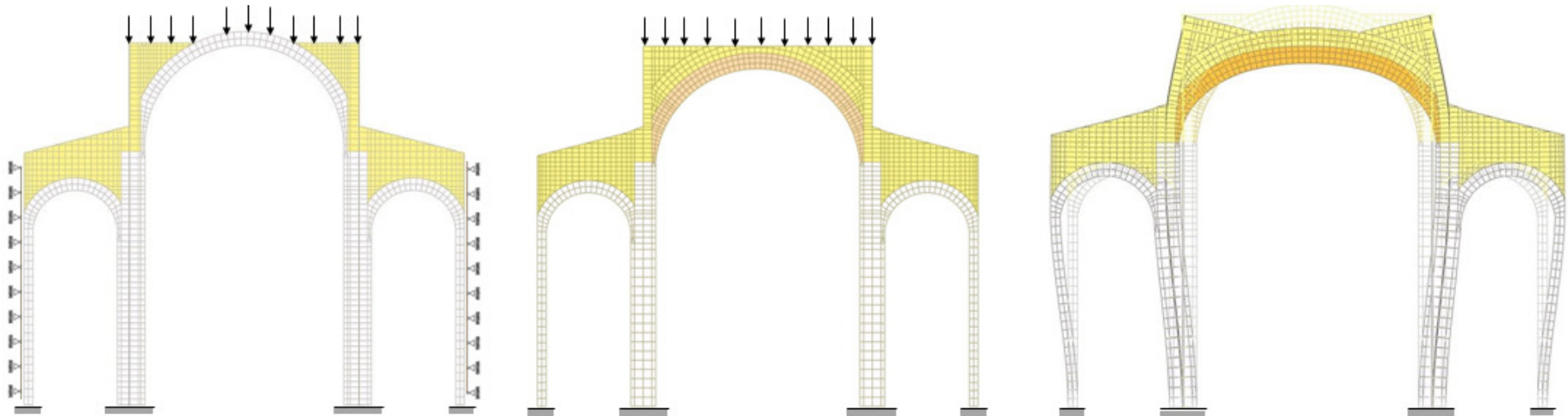
A PRESCINDERE DALLE VALUTAZIONI ANALITICHE, LE STRUTTURE DI SOSTEGNO DELLA CUPOLA NON GARANTISCONO UN SUFFICIENTE GRADO DI SICUREZZA NON SOLTANTO NEI CONFRONTI DEL SISMA, MA ANCHE DEL SOLO PESO PROPRIO



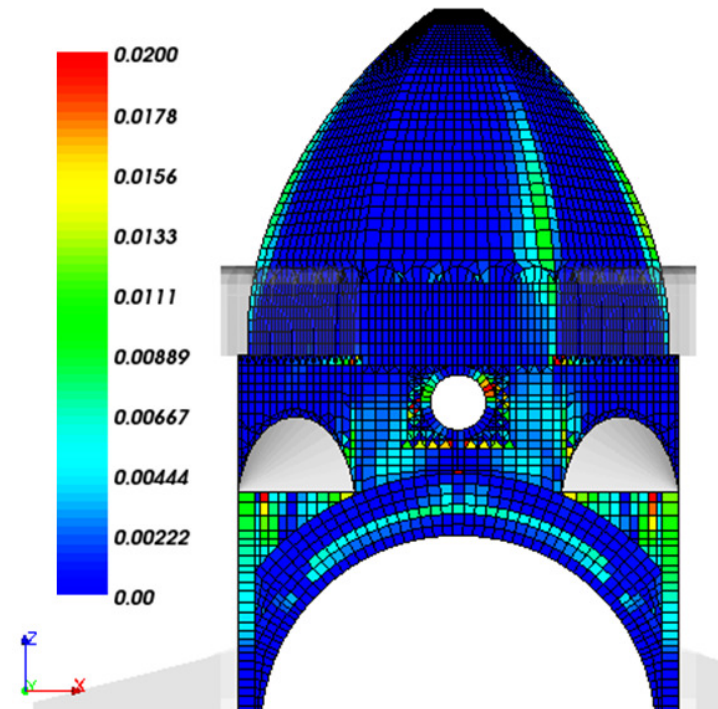
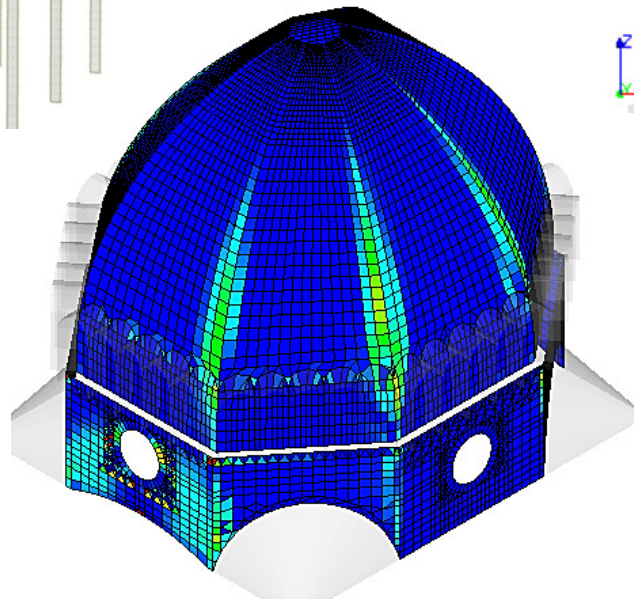
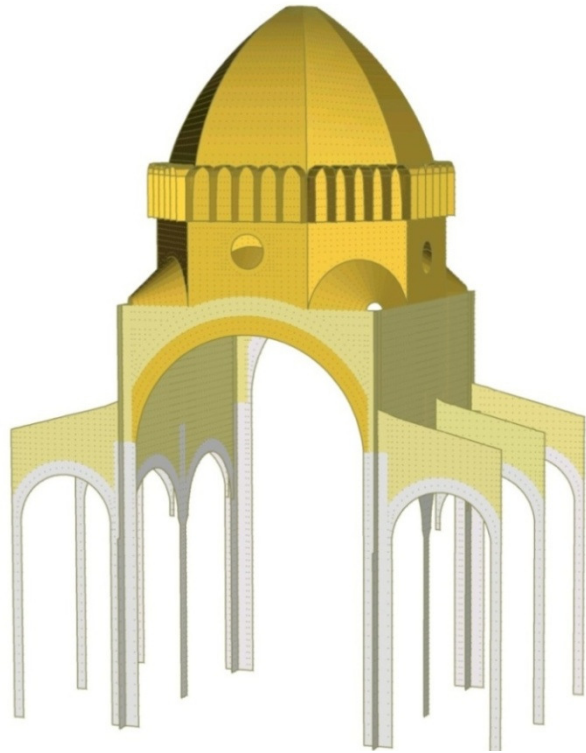
I MODELLI DI CALCOLO



I MODELLI DI CALCOLO



I MODELLI DI CALCOLO

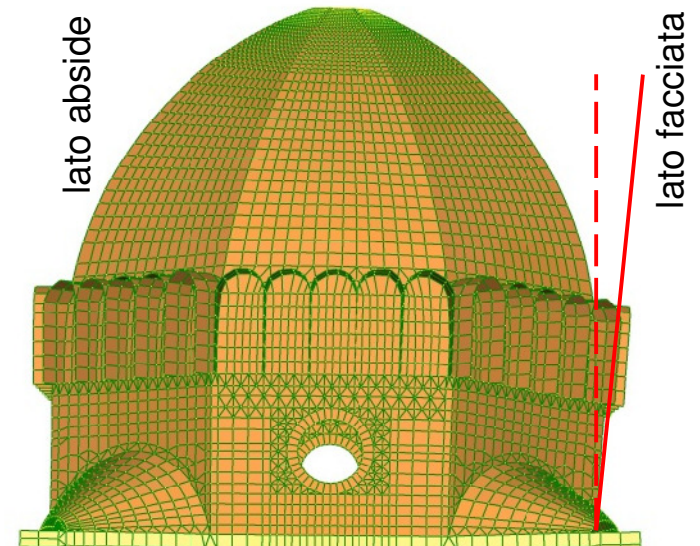
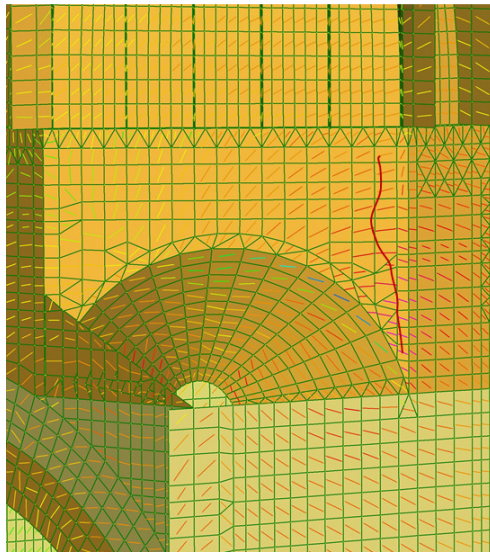
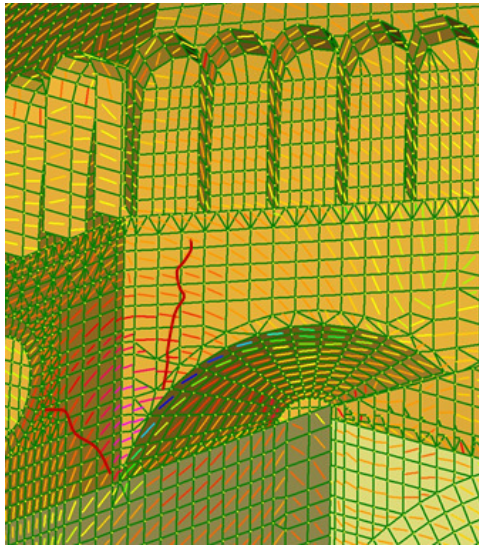


deformazioni di frattura

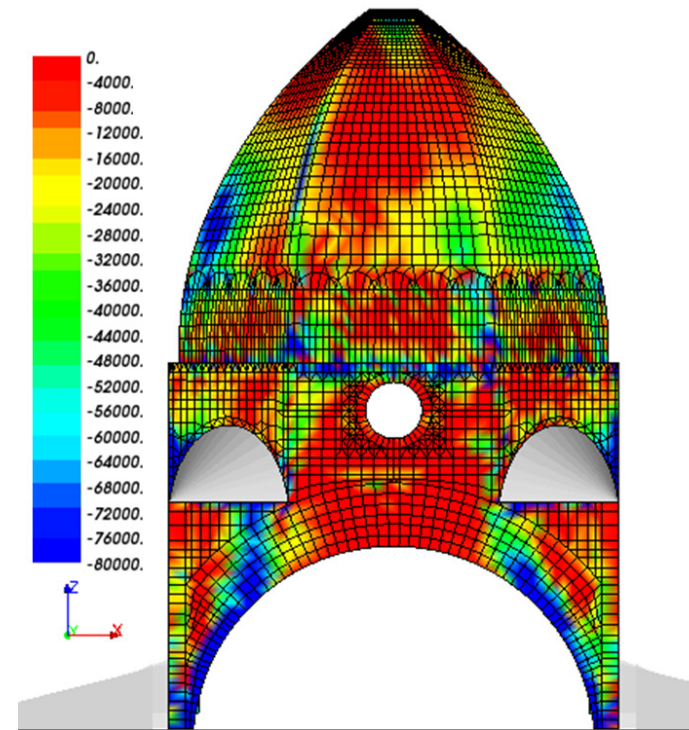
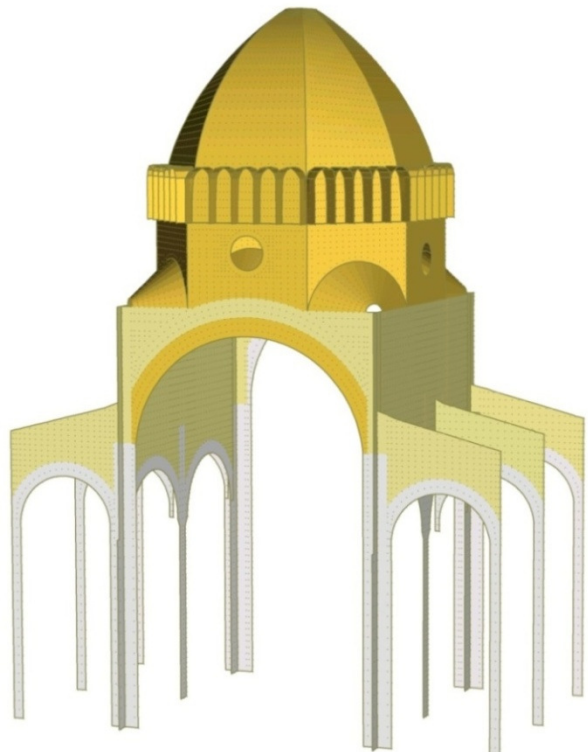
I MODELLI DI CALCOLO



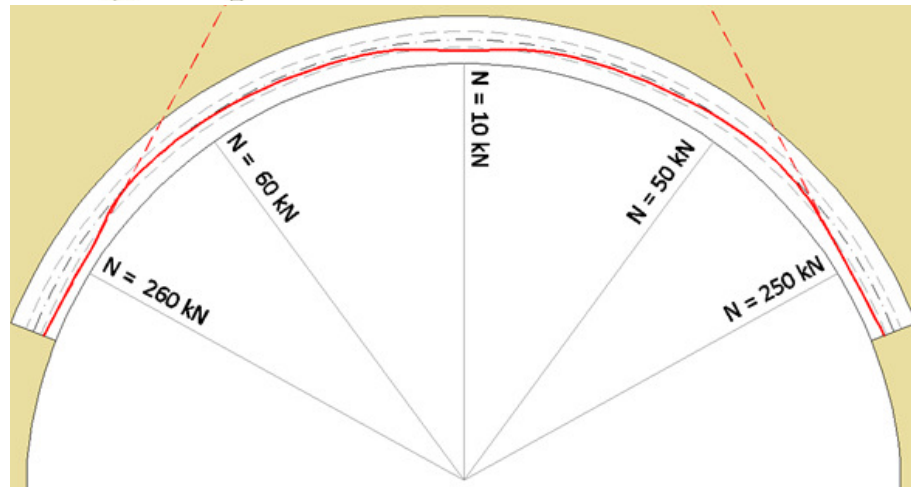
I MODELLI DI CALCOLO



I MODELLI DI CALCOLO

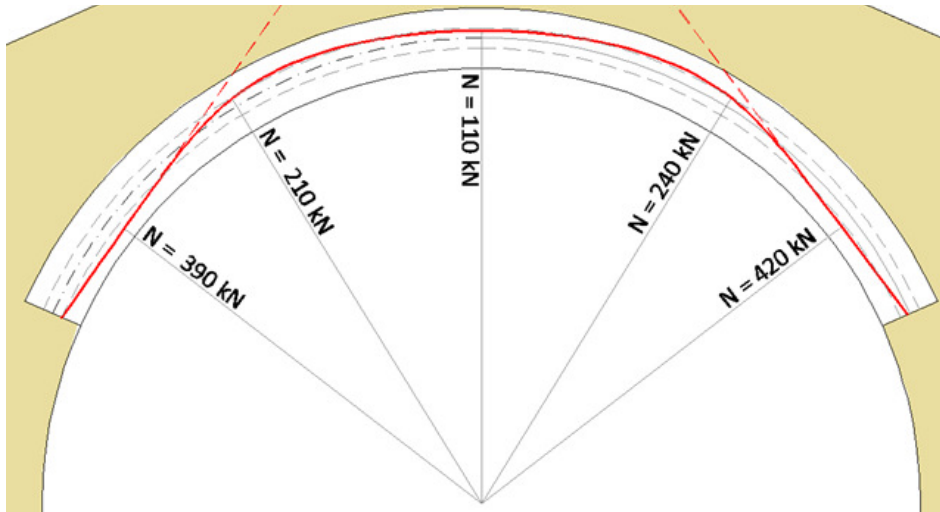


tensioni principali minime



ARCO DI MATTONI

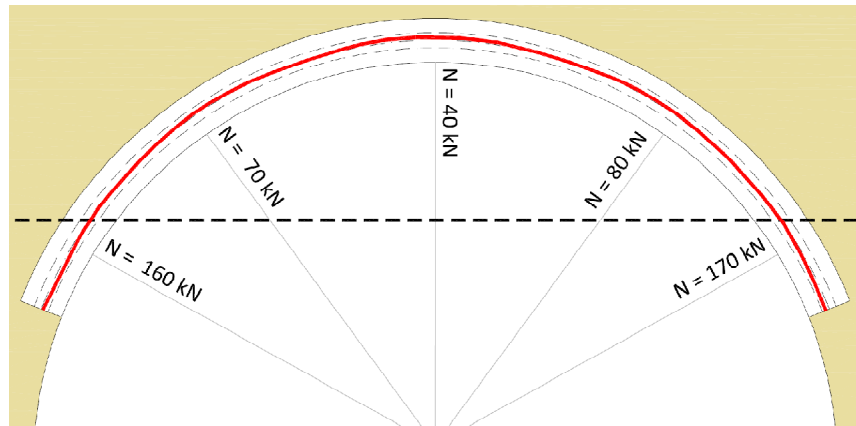
I MODELLI DI CALCOLO



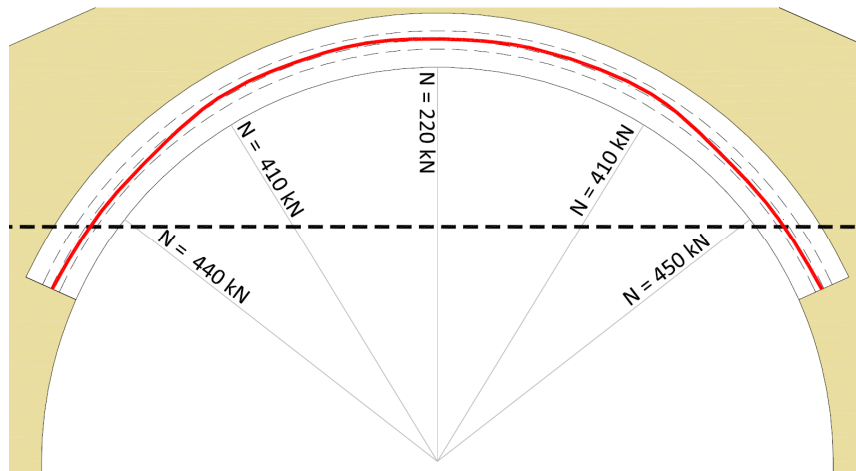
ARCO DI TRAVERTINO



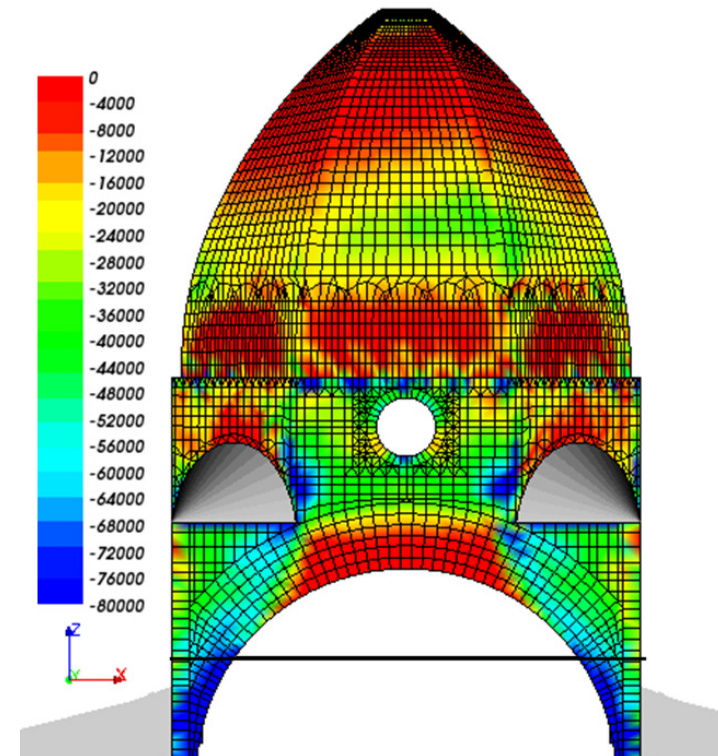
I MODELLI DI CALCOLO



ARCO DI MATTONI



ARCO DI TRAVERTINO



CONCLUSIONI

Contributo della modellazione numerica come strumento diagnostico e di previsione

Sinergia tra discipline umanistiche e tecniche

Prevenzione e sicurezza statica per la conservazione