



DIPARTIMENTO DI INGEGNERIA CIVILE,
AMBIENTALE, DEL TERRITORIO, EDILE E DI CHIMICA

SSD:

ICAR/10 – ICAR/11

1. GENERAL LABORATORY INFORMATION

1.1 Name of the laboratory

BT Lab - Building Technologies Laboratory

1.2 Addresses and telephone numbers of the laboratory

Address	Via E. Orabona, 4 – 70125 BARI
Telephone number	080.593.3456
Fax	
Mail	rocco.rubino@poliba.it
Website	

1.3 Short description of the laboratory

The Research Laboratory of Building Technologies is a structure of the DICATECh Department engaged in activities and research projects offering qualified technical support to professors and researchers of the Politecnico di Bari. The Laboratory, with certified personnel, offers applied research and transfer services to the territory technology also through agreements with companies and public and private bodies. The Laboratory of Building Technologies carries out activities in the field and in the laboratory aimed at analyzing the performance of building components, the study of building diseases, monitoring of confined spaces and the energy diagnosis of buildings, offering advanced solutions for maintenance, storage and recovery of existing built heritage, with particular attention to the protection and enhancement of Cultural Heritage, also experimenting with the use of techniques based on Virtual and Augmented Reality.

1.4 Services offered by the laboratory and research activities

- Investigation of materials, decay, crack and damp patterns, particularly for the built heritage, by means of advanced digital diagnostic techniques;
- Assessment of masonry structures and stone elements by integrated systems of diagnostic tests, including sonic and ultrasonic testing, single and double flat-jacks, bore-hole drilling, reconstruction of stratigraphy, water-content measurements, video-endoscopy, qualitative active and passive thermography, high frequency radar scanning for 3D tomography;
- Assessment of vaults and slabs by integrated systems of diagnostic tests, including visual inspection, video-endoscopy, radar scanning, magnetometric testing, ultrasonic testing, qualitative active and passive thermography, bore-hole drilling, reconstruction of stratigraphy;
- Investigation and assessment of underground structures, foundations and anthropic caves by radar scanning at different frequencies and digital reconstruction of stratigraphy and/or 3D tomography;
- Assessment of reinforced concrete structural elements by integrated systems of diagnostic tests, including rebound-hammer testing, ultrasonic testing, SonReb correlation technique for estimating the onsite mechanical resistance, assessment of the concrete carbonation, measurements of the corrosion potential in the rebars, magnetometric testing;
- Assessment of timber elements by integrated systems of diagnostic tests, including resistograph techniques, ultrasonic testing, high frequency radar scanning, visual inspection;
- Analysis of energy performances of building components, including thermographic radiometric mapping, onsite thermal transmittance measurement, advanced modelling for dynamic simulations;
- Indoor microclimate monitoring by measurement of relevant environmental parameters, including air temperature, relative humidity, radiant temperature and velocity, as well as heat flux, surface temperature and lightening;
- Measurement, monitoring and analysis of deformations, cracks and vibrations by multi-sensors reading units, including strain gauges, electric extensometers, LVDT, seismic accelerometers, advanced modelling for dynamic simulations.

Recent research projects:

- BE S²ECURE – Built Environment Safer in Slow and Emergency Conditions through Behavioural Assessed/Designed Resilient Solutions (MIUR, PRIN 2017)
- VERBUM – Virtual Enhanced Reality for Building Modelling (Apulia Region, INNONETWORK)
- 3D IMPACT – Virtual Reality and 3D Experiences to Improve territorial Attractiveness, Cultural Heritage, Smart Management and Touristic Development (Unione Europea, Interreg IPA CBC Italy, Albania, Montenegro)
- Contactless system for diagnostics with augmented reality of artefacts of significant cultural interest and difficult to access - PAC02L2_00101 (MIUR, StartUp)

2. PERSONALE DEL LABORATORIO

2.1 Scientific manager

<i>name</i>	<i>role</i>	<i>tel.</i>	<i>e-mail</i>
Prof. ing. Fabio Fatiguso	PO	3789	fabio.fatiguso@poliba.it

2.2 Technical manager			
<i>name</i>	<i>role</i>	<i>tel.</i>	<i>e-mail</i>
Rocco Rubino	Technician	3442	rocco.rubino@poliba.it

2.3 Teaching staff			
<i>name</i>	<i>role</i>	<i>tel.</i>	<i>e-mail</i>
prof. Ing. Elena Cantatore	RTDa	3420	elena.cantatore@poliba.it
prof. Ing. Mariella De Fino	RTDb	3342	mariella.defino@poliba.it
prof. Ing. Arch. Guido Raffaele Dell'Osso	PA	3341	guidoraffaele.dellosso@poliba.it
prof. Ing. Francesco Fiorito	PA	3401	francesco.fiorito@poliba.it
prof. Ing. Francesco Iannone	PA	3344	francesco.iannone@poliba.it

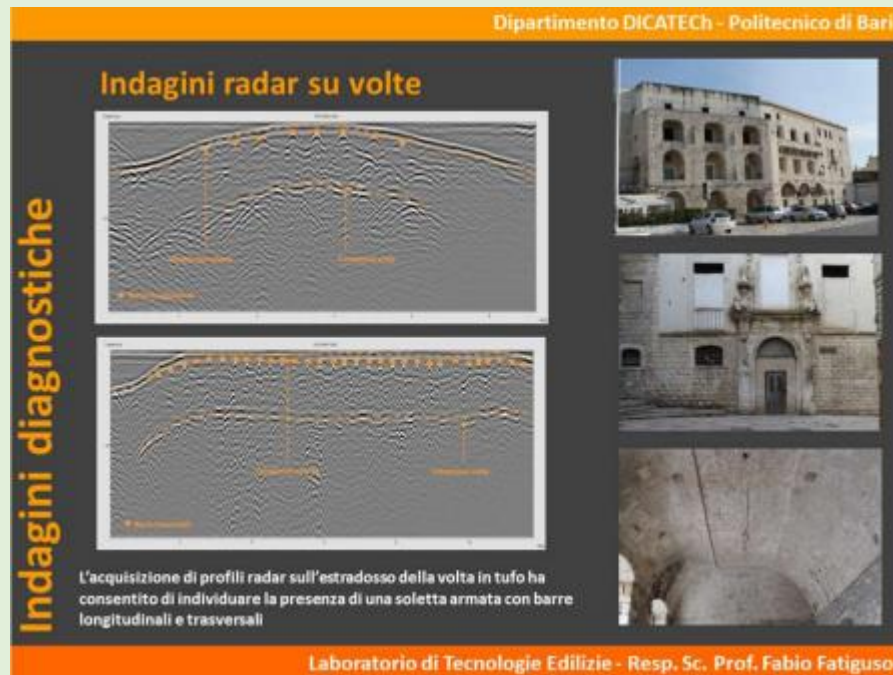
2.4 Technical staff			
<i>nome</i>	<i>ruolo</i>	<i>tel.</i>	<i>e-mail</i>

2.5 PhD students			
<i>name</i>	<i>year</i>	<i>tel.</i>	<i>e-mail</i>
ing. Rosella Alessia Galantucci	XXXIV		rosella.galantucci@poliba.it
ing. Valeria Giannuzzi	XXXVI		valeria.giannuzzi@poliba.it
ing. Margherita Lasorella	XXXV		margherita.lasorella@poliba.it
ing. Alessandra Martinelli	XXXVI		alessandra.martinelli@poliba.it
ing. Antonella Musicco	XXXIV		antonella.musicco@poliba.it

2.6 Research fellows, fellows			
<i>name</i>	<i>role</i>	<i>tel.</i>	<i>e-mail</i>
dott. ing. Silvana Bruno	Assegnista		silvana.bruno@poliba.it
dott. ing. Albina Scioti	Assegnista		albina.scioti@poliba.it

3. MAIN LABORATORY EQUIPMENT

- GPR radar system - Single channel unit, 600MHz antenna, high frequency antenna 2GHz, software for 3D radar processing



- System for active and passive thermography in the Civil / Construction sector - Uncooled microbolometer 7-14 μ m, short wave IR heaters, software for thermographic analysis

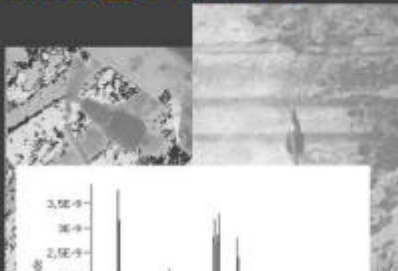
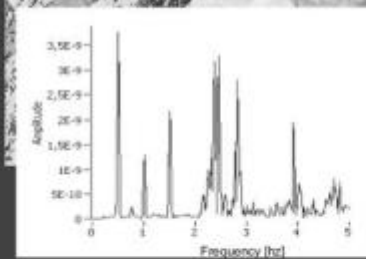



- Modular multichannel data acquisition system for measurement: current, acceleration, temperature, deformation monitoring, strain-gauges, thermocouples, accelerometers, seismics; Labview National Instruments software.

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Monitoraggio dinamico

Indagini diagnostiche



L'acquisizione di misure di accelerazione ha consentito di identificare le ampiezze di oscillazione della struttura e le relative frequenze naturali, sulla cui base calibrare modelli teorici di simulazione



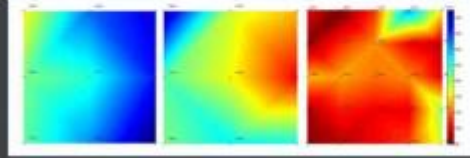
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- Low and high frequency microseismic tests - Acquisition unit for sonic and ultrasonic tests, PDA, instrumented hammer, low transducer 2KHz frequency, 55KHz high frequency transducer, accelerometer, analysis software

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Prove soniche su muratura

Indagini diagnostiche



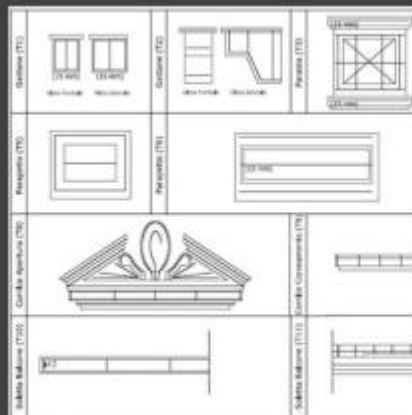
Le misure di velocità microsismica in bassa frequenza hanno consentito di individuare aree a diversa omogeneità per presenza di vuoti e discontinuità

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- Magnetometric investigations on reinforced concrete elements - Pacometer, kit half-cell to measure corrosion potential

Indagine magnetometrica su cls

Indagini diagnostiche



L'indagine sub-superficiale con tecnica magnetometrica ha consentito la caratterizzazione morfologica delle armature metalliche inserite all'interno della matrice cementizia. E' stato possibile determinare posizione, orientamento e diametro degli elementi metallici presenti

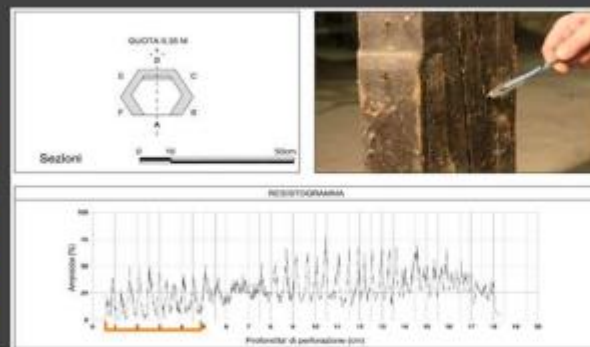


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- RESI-F400-S wood penetrometer

Rilievi e indagini su manufatti lignei

Indagini diagnostiche



La classificazione dei manufatti lignei, finalizzata alla diagnosi dello stato di conservazione e alla stima di resistenza e sezioni residue secondo la norma UNI 11119, viene condotta attraverso un sistema integrato di ispezioni visive, mappature e prove strumentali in situ (misure resistografiche corredate da prove microsismiche e scansioni radar)

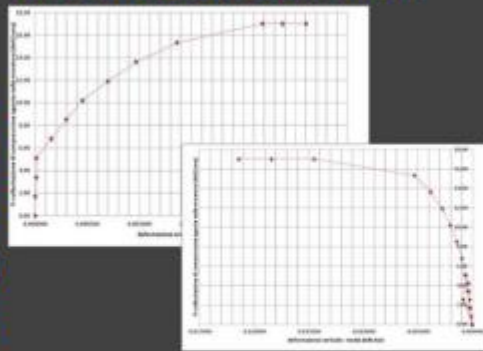


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- Single and Double Flat Jacks - High deformability Flat Jacks, manual hydraulic pump, deformometer mechanical digital, petrol cutter with eccentric transmission for cuts in lithoid materials and concrete with diamond blade \varnothing 350 mm

Martinetti piatti su muratura

Indagini diagnostiche



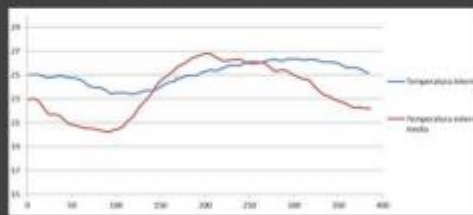
L'esecuzione di prove con martinetto piatto doppio su una porzione del paramento murario ha consentito la caratterizzazione della curva tensione-deformazione e, quindi, la stima del modulo di elasticità, del coefficiente di Poisson e della tensione di rottura



- Acquisition and monitoring system of microclimatic parameters - Unit of data acquisition and storage, temperature probes, relative humidity of the air

Monitoraggio microclimatico

Indagini diagnostiche



L'acquisizione di parametri ambientali relativi a temperatura e umidità relativa dell'aria interna e esterna, condotta con centraline di multiacquisizione e/o termografo, ha consentito la valutazione dei livelli di comfort nello spazio confinato.



- Building video-endoscopy system

Ispezione video-endoscopica di cavità

Indagini diagnostiche



Ispezione di condotte, cisterne e locali inaccessibili interrati sotto il piano di calpestio di un cortile

- Mechanical hammer with calibration anvil

Prove sclerometriche su strutture in cls

Indagini diagnostiche



	S ₁	S ₂	S ₃
IR ₀	53	48	47
dev	2,54	2,17	1,80
σ (Kg/cm ²)	660	550	530

L'esecuzione di misure sclerometriche ha consentito di stimare la resistenza cubica del cls sulla base dell'indice di rimbalzo.



- 3D printer for rapid prototyping

Stampa 3D per modelli e prototipazione rapida



Realizzazione di modelli in scala mediante stampa 3D