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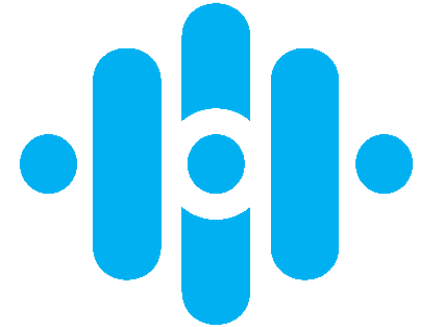
CLOSING CONFERENCE

NOISE TRAINING PROJECT

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IMPROVEMENT OF ENVIRONMENTAL
NOISE
MANAGEMENT
SKILLS IN AUDITS



Qualification requirements and Curriculum development

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Summary



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State of the art: Professional Acousticians in Italy-Turkey-Spain



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How to become a Professional Acoustician?

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How to become a Professional Acoustician in Italy



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There is a National Register of Competent Technicians in Acoustics established at the Ministry of the Environment.

It is necessary to have a Bachelor's or master's degree in technical or scientific subjects, and one of the following requirements:

- To have a University master with a module of at least 12 credits in acoustics (3 of acoustics laboratories)
- To pass a Course in acoustics for competent technicians, referred to a defined program
- To obtain 12 university credits in acoustics (3 of acoustics laboratories)
- To have a PhD, with a doctoral thesis in acoustics.

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How to become a Professional Acoustician in Italy



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Courses	
<h3>Institutions</h3> <ul style="list-style-type: none">• Universities, research bodies• Professional orders or colleges• Other “certified” institutions	<h3>Requirements</h3> <ul style="list-style-type: none">• 180 hours (60 practice hours)• Recognized by regional authority• Reference program

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How to become a Professional Acoustician in Italy



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COURSE PROGRAM (MODULES)	Hours
Fundamental acoustics	8 - 12
Sound propagation and room acoustics	12 - 14
Instruments and Procedures for noise measurements	10 - 14
National / Regional / Municipal regulations	8 - 12
Traffic Noise and Railway noise	6 - 8
Aircraft and Harbor noise	6 - 8
Other National and EU regulations and directives	6 - 8
Building acoustics	10 - 16
Criteria for planning, mitigate and control of noise emissions	16 - 20
Noise and vibration in working places	12 - 24
Legal (forensic) acoustics	6 - 8
Training on the use of sound level meters and relative software	15 - 30
Training on the use of building acoustics software	15 - 20
Training on the use of noise propagation software	15 - 20

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How to become a Professional Acoustician in Turkey



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Graduates of engineering, architecture or science faculties

Training course given by the institution which has protocol defined by the Ministry

Requirements for giving training course: University lecturers and Postgraduate “experts in each topic”

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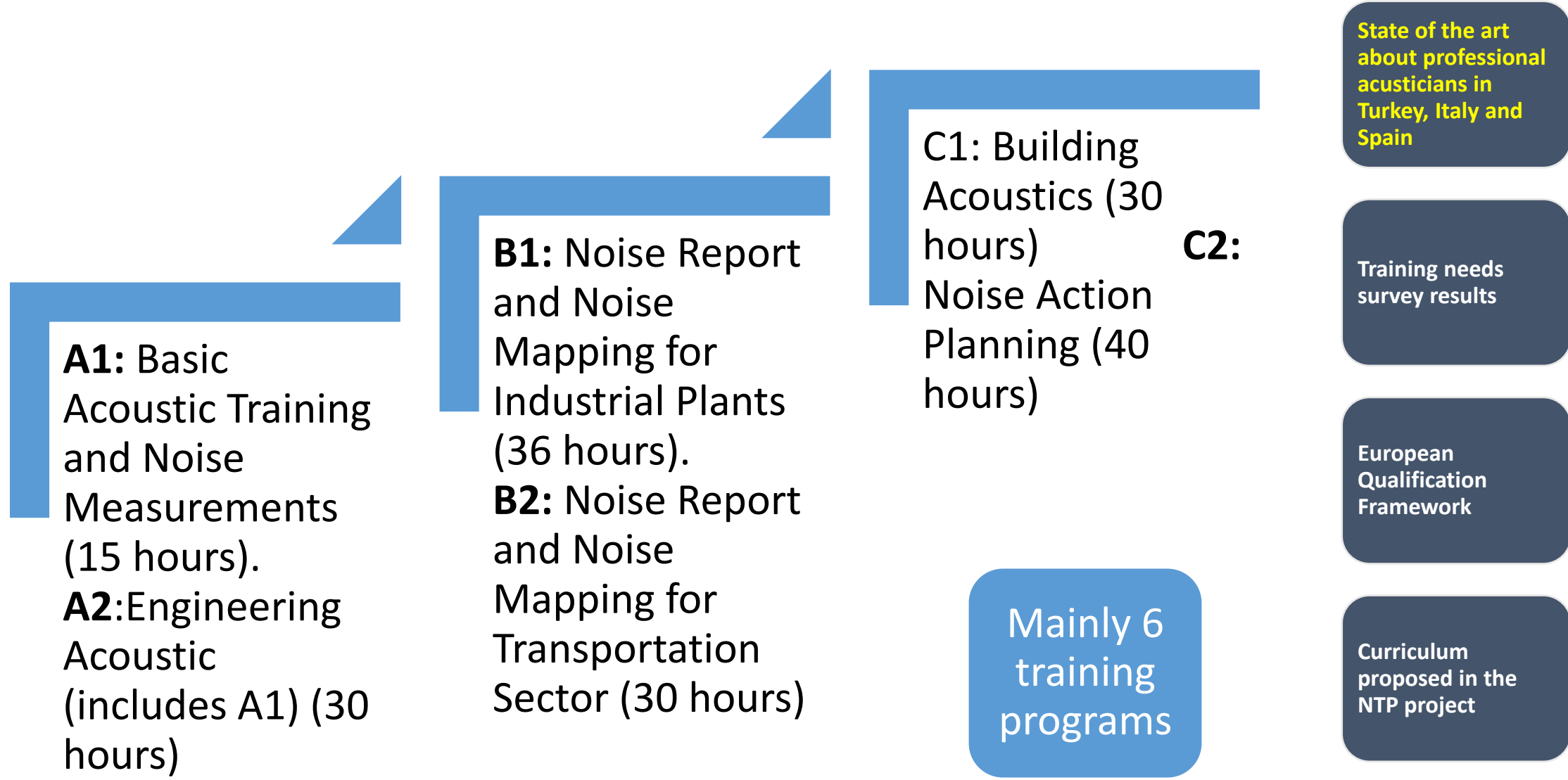
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How to become a Professional Acoustician in Turkey



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How to become a Professional Acoustician in Spain



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National level

- No direct and explicit requirements

In some regions, the laboratories must be certified according to ISO 17025

- No academic level or qualification requirements
- Training requirements are defined by each laboratory and are evaluated by an external auditor

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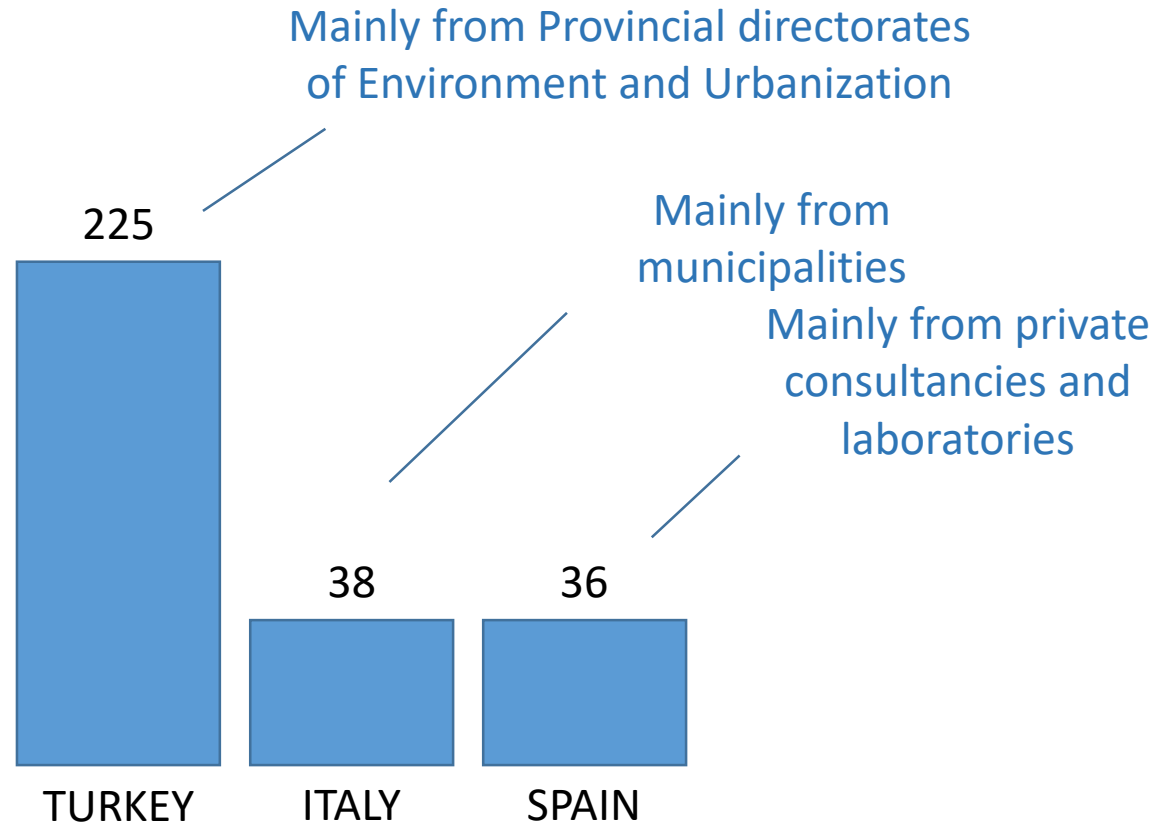


Training needs survey



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- We prepared a questionnaire to detect training needs and gaps among professionals working on environmental noise



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Why to draw new harmonized curriculum?



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- Common reasons:
 - needs to realise a dedicated course to perform noise measurements and audits
 - training gaps to define noise management activities, necessary for city managers
 - adaptation to updated EU regulation
 - collaboration and exchange of practices and knowledge
- Specific reasons
 - Qualification framework in Spain is minimal

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Harmonization and improvement



European Qualification Framework



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In 2018

EQF celebrates
10th anniversary

“Learners, employers, training providers and recognition bodies can better understand the level, content and value of a qualification”

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European Qualification Framework



- The European Qualifications Framework (EQF) is a common European reference framework whose purpose is to make qualifications more readable and understandable across different countries and systems.
- This is important to support cross-border mobility of learners and workers and lifelong learning across Europe
- 39 European countries currently involved in its implementation. Turkey is committed to developing the Turkish Qualification Framework, harmonized with the European one.

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European Qualification Framework



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- The core of the EQF are its 8 reference levels, defined in terms of learning outcomes, i.e. knowledge, skills and autonomy-responsibility

Level	Knowledge	Skills	Responsibility and autonomy
1 to 8	Described as theoretical and/or factual.	Described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).	Described as the ability of the learner to apply knowledge and skills autonomously and with responsibility

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EDUCATION LEVELS

EQF LEVEL 8	ACADEMIC LEVEL	DOCTORATE
EQF LEVEL 7		MASTER
EQF LEVEL 6	POST UPPER SECONDARY LEVEL	BACHELOR
EQF LEVEL 5		HIGHER NATIONAL DIPLOMA
EQF LEVEL 4	UPPER SECONDARY LEVEL	HIGHER NATIONAL CERTIFICATE, UPPER SECONDARY DIPLOMA
EQF LEVEL 3	SECONDARY LEVEL	SECONDARY DIPLOMA OR VOCATIONAL DIPLOMA
EQF LEVEL 2	PRIMARY LEVEL	SECONDARY SCHOOL WITH NO DIPLOMA
EQF LEVEL 1		PRIMARY SCHOOL

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REDEFINITION

ENV NOISE
TECHNICIAN



ENV NOISE
ENGINEER



ENV NOISE
MANAGER



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	EQF LEVEL 8	ACADEMIC LEVEL	DOCTORATE
ENV NOISE MANAGER	EQF LEVEL 7		MASTER
ENV NOISE ENGINEER	EQF LEVEL 6	POST UPPER SECONDARY LEVEL	BACHELOR
	EQF LEVEL 5		HIGHER NATIONAL DIPLOMA
ENV NOISE TECHNICIAN	EQF LEVEL 4	UPPER SECONDARY LEVEL	HIGHER NATIONAL CERTIFICATE, UPPER SECONDARY DIPLOMA
	EQF LEVEL 3	SECONDARY LEVEL	SECONDARY DIPLOMA OR VOCATIONAL DIPLOMA
	EQF LEVEL 2	PRIMARY LEVEL	SECONDARY SCHOOL WITH NO DIPLOMA
	EQF LEVEL 1		PRIMARY SCHOOL

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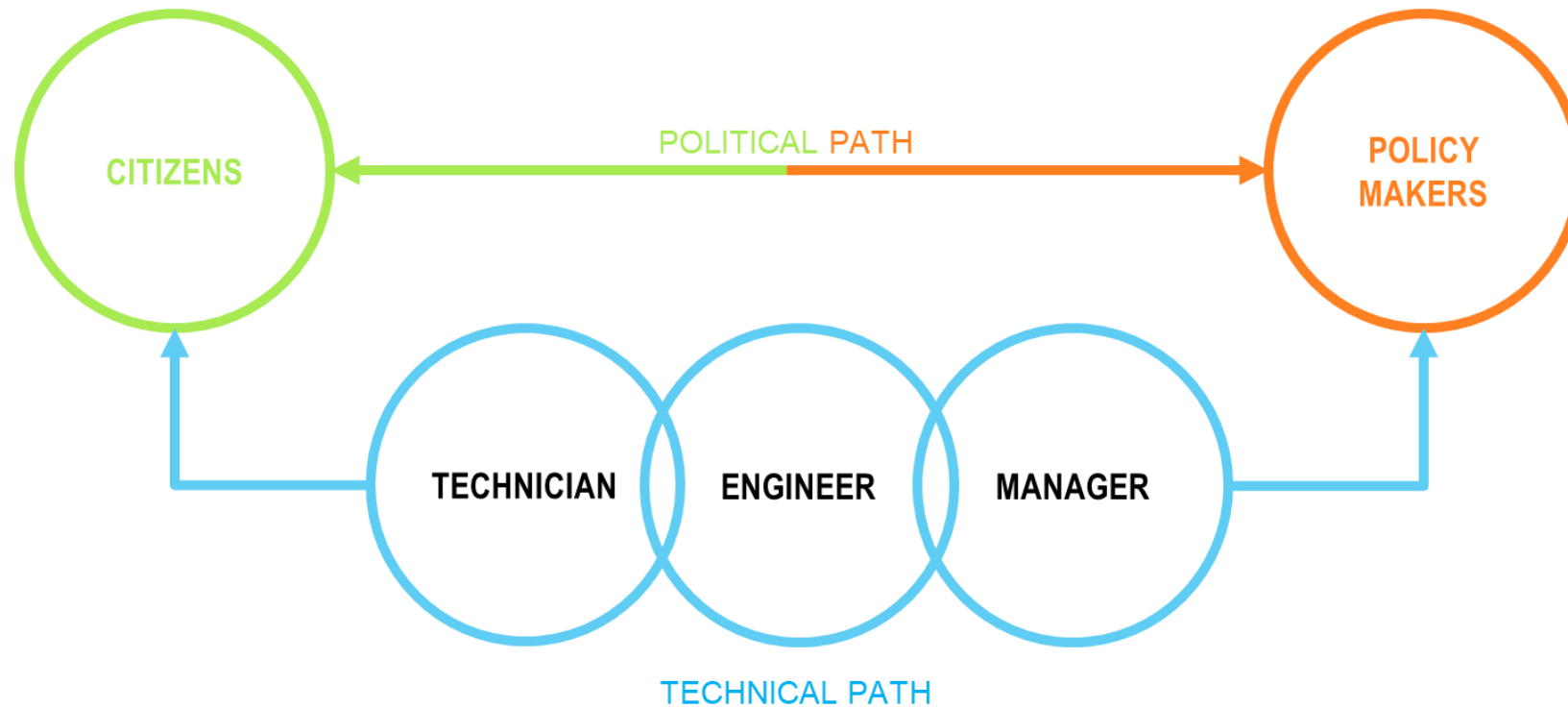


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For instance, at city level...



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NTP proposal: Role and Tasks of the Env Noise Measurement Technician



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- **Role ...**

- Perform Audit and Noise measurements under the control of the Environmental Noise Engineer

- **Main skills ...**

- Autonomy to perform noise measurements and write the audit report according to law requirements
- Communication skills

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NTP proposal: Role and Tasks of the Env Noise Engineer



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- **Role ...**

- Technical interface between polluters (real, presumed, potential) and (real, presumed, potential) polluted, control authorities and policy makers
- Support the acoustic managers of the local authority to define noise zoning and action planning
- Forensic assistant , technical auxiliary of the Judge in legal disputes regarding noise
- Building acoustics

- **Main skills ...**

- Able to perform noise measurements and write the audit report according to law requirements
- Communication skills
- High level skills on theoretical and practical aspects
- High level skills to design noise monitoring activities, noise mapping, action planning, quiet areas, etc...

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NTP proposal: Role and Tasks of the Env Noise Manager



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- **Role ...**
 - Support to policy makers
 - Noise mapping, action planning management
 - Noise reduction plan management
 - Management of audit
- **Main skills ...**
 - Basic level skills on theoretical and practical aspects
 - High level skills on legislation
 - High level skills to design noise monitoring activities, noise mapping, action planning, quiet areas, etc...
 - Communication skills

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The NTP proposal (1/5)



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 SKILLS IN AUDITS

Skills	Measurement technician		Engineer		Manager	
	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)
<p>Fundamentals of acoustics</p> <p><i>Sound pressure and sound power. Pure tones, frequency, the audible range, broadband noise, octave and third-octave frequency analysis of noise. Sound pressure level, sound intensity level, sound power level and the decibel scale. The range of decibel levels and the significance of level changes (3dB, 10dB, 20dB etc) in terms of energy content and loudness. The procedure for combining and subtracting decibel levels, including background levels.</i></p> <p>Frequency bands: <i>The variation of hearing sensitivity with frequency and level: the A-weighting scale.</i></p> <p>Noise indicators: <i>Steady and time-varying noise levels: LAeq, LAE and statistical levels LA10, LA90 etc. Calculations involving the LAeq and LAE. The effects of noise on people: hearing damage, annoyance, activity interference and sleep disturbance.</i></p>	Medium	4T	Advanced	6T	Medium	4T
<p>Basic concept about the determination of sound power level</p>	Medium	2T+4P	Advanced	4T+4P	-	-



The NTP proposal (2/5)



IMPROVEMENT OF ENVIRONMENTAL
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Skills	Measurement technician		Engineer		Manager	
	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)
Outdoor sound propagation (Basic concept about sound source modelling according to point/line/planar source model; reflection, absorption, diffraction)	Medium	2T+2P	Medium	4T+2P	Basic	2T
Indoor sound propagation and basic concepts of building acoustics	Medium	2T+2P	Medium	4T+2P	Basic	2T
Training on the use of sound level meters Instrument features Instrument legal requirements Instruments maintenance and quality assurance	Advanced	4T+4P	Advanced	6T+4P	Basic	4T
Road Infrastructures noise: Concepts and measurement. Measurement location selection. Measurement time sampling (time intervals and number of samples). Microphone position and corrections Railway Infrastructures noise: Concepts and measurement. Measurement location selection. Measurement time sampling (time intervals and number of samples). Microphone position and corrections Air traffic Infrastructures noise: Concepts and measurement. Measurement location selection. Measurement time sampling (time intervals and number of samples). Microphone position and corrections	Basic	6P	Medium	6T+6P	Basic	4T



The NTP proposals (3/5)



IMPROVEMENT OF ENVIRONMENTAL
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Skills	Measurement technician		Engineer		Manager	
	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)
Road Infrastructures noise: Processing and reporting	Basic	2P	Advanced	2T+2P	-	-
Railway Infrastructures noise: Processing and reporting	Basic	2P	Advanced	2T+2P	-	-
Air traffic Infrastructures noise: Processing and reporting	Basic	2P	Advanced	2T+2P	-	-
Activities: <i>Industrial, construction sites, leisure, temporary. Measurement and processing. Background noise, penalties (ISO 1996). Measurement location selection. Measurement time sampling (time intervals and number of samples). Microphone position and corrections</i>	Advanced	12T+8P	Advanced	12T+8P	Basic	4T
Legal acoustics	-	-	Advanced	8T	Advanced	8T
Noise monitoring (including low cost sensor networks)	Basic	2T	Advanced	8T	Medium	4T



The NTP proposal (4/5)



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Skills	Measurement technician		Engineer		Manager	
	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)
Interpretation of local/regional noise regulation National noise regulation European noise regulation	-	-	Medium/ Advanced	8T	Advanced	10T
Extended regulation related to noise sources	-	-	-	-	Basic	2T
Noise maps in relation to END Noise mapping input data Noise maps interpretation	-	-	Advanced	8T	Medium/ Advanced	6T
Noise prediction software	-	-	Advanced	8T + 16P	Basic	4T + 2P
Action plans in relation to END Noise mitigation measures	-	-	Medium	4T + 12P	Medium/ Advanced	8T + 2P



The NTP proposal (5/5)



IMPROVEMENT OF ENVIRONMENTAL
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Skills	Measurement technician		Engineer		Manager	
	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)	Level of detail	Hours Theory (T) / Practice (P)
Quiet areas identification and analysis	-	-	Medium	4T	Advanced	8T + 2P
Quiet areas preservation and management						
Criteria for acoustic planning and zoning related to land use	-	-	Basic	2T	Advanced	8T + 2P
Non acoustic factors (mobility, landscape, communication, people engagement, etc)	-	-	Basic	4T	Advanced	8T
Calculation of uncertainty of measurements results	-	-	Advanced	10T	-	-
Interpretation of uncertainty of instruments and results	Advanced	2T	Advanced	2T	Advanced	2T
Quality assurance procedures (ISO 17025)	Basic	2T	Advanced	8T	Basic	2T
Health risks	Basic	2T	Basic	2T	Basic	2T
Communication skills (for interaction with receivers and noise source managers during audit)	Basic	2T	Basic	2T	-	-

	EQF LEVEL	# THEORY HOURS	# PRACTICE HOURS
TECHNICIAN	4	36	32
ENGINEER	6	126	60
MANAGER	7	92	8



Conclusions



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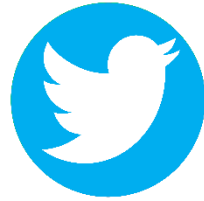
- According to both the Professional Acoustician figures experienced in Italy/Spain/Turkey and the needs coming from the results of questionnaires submitted to the main stakeholders, three different new Professional Figures have been identified in the framework of NTP project:
 - **The Acoustic Measurement Technician**
 - **The Acoustic Engineer**
 - **The Acoustic Manager**
- Roles, tasks and skills of the three professional figures have been proposed and the structure of course has been identified.



THANK YOU FOR YOUR ATTENTION AND COOPERATION!



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