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New Technologies for Safeguarding Cultural Heritage in Spain

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1. INTRODUCTION

Safeguarding Cultural Heritage in Spain faces problems which may have common features with those occurring in other European countries.

I would like to present here a short review of a personal selection of the latest studies and research done in my country, related to the Protection of our Heritage.

I will also explain how New Technologies have been already used in my country and how they could be used in the future to maintain our Heritage, to preserve its historical and artistic values and to increase the involvement of younger generations in the process of finding the necessary solutions to integrate it in a New idea of European Heritage, as well as finding ways to integrate our past in our everyday way of life without destroying it.

2. SOCIAL INVOLVEMENT AND THE USE OF NEW TECHNOLOGIES.

2.1 Tourism, Economic development and Conservation: the “Alhambra” Palace in Granada.

In the last 15 years there have been several environmental problems related with one of the best internationally known Spanish Historic Monuments: the “Alhambra” Palace in Granada [Fig. 1].



Figure 1. Alhambra Palace, Granada, Spain. Drawing by Owen Jones.

The “*Patronato de la Alhambra y Generalife*” (The Alhambra and Generalife Trust¹) is an independent body with the participation of members of the Administration (State, Regional and Local authorities), of the University of Granada and a maximum of five Private Members or

¹ A “*Patronato*” is a Spanish legal figure, similar but not exactly equivalent to a Trust.

Institutions. The conservation of this monument and its staff, around 250 people², is financed through the economic benefits it generates.

This popularity has its drawbacks. Due to the number of people visiting it, more than 7.700 per day in summer, the degree of deterioration has reached a level which has obliged the authorities to take measures to prevent further damages. It has not been closed to the public like some other Spanish Patrimony in a high risk situation such as the Prehistoric paintings in Altamira Caves, but the flow of tourists is now submitted to strict environmental control and New Technologies are used in several ways: from ticket reservation³ to the studies and research on the monument⁴. There are facilities for international researchers and the archives staff usually provide references of local experts with similar interests. Spanish studies are usually closely related to the necessities of conservation of the monument, some of the latest being about visitors' flow and interests, to adapt if needed timetables, number of visitors and access according to preventive measures, others with the protection of surrounding areas like those on the historic gardens and forests, related to the revision of the Legal Regulation on Urbanism Protection, the "*Plan Especial de la Alhambra*", dating from 1986.

The urban area surrounding the palace has also provoked an international debate, due to the polemic design of an enormous discotheque nearby called "*Rey Chico*", allowed initially by the authorities but stopped during construction process. Citizens protested and demonstrated, send round a letter with several thousand signatures to obtain its demolition and in April 1998 it seemed that was going to be done. The use of modern communications, including Internet, explaining the damage this discotheque would do to the Palace, shows a way to internationally discuss these kind of interventions endangering World Heritage⁵.

In march 1999, newspapers started again controversy as the regional authorities ("*Junta de Andalucía*") considered they should not demolish it, as the three Spanish Administrations, State, Regional and Local, had bought it for a price around a thousand million pesetas. The demolition is still under discussion.⁶

2.2 Citizens information on Cultural Heritage: the Data Bases created by the Spanish Ministry of Culture and other public or private institutions.

The Spanish Ministry of Culture created in the 80's the PIC's or Points for Cultural Information, to allow an easier access for citizens to the catalogues of monuments and other cultural data. Some of those data bases are now available in Internet and provide basic information on Spanish Heritage. The references to the buildings, archaeological areas, historic gardens, natural

² Most of this data are from the lecture "*Patronatos*", given by Ms. Esther Cruces Blanco, from the Division of Research and Communication of "*Patronato de la Alhambra y el Generalife*", in the "*Fundación Cultural Santa Teresa*", in Avila, may 2000.

³ Free access (Spanish and English) in: <http://www.alhambra-patronato.es/> -> English -> General Information ->Types of Tickets and Prices, and also ->Where to get a Ticket. To buy tickets in advance in Internet: <http://www.alhambratickets.com/>

⁴ Free access (Spanish and English) in: <http://www.alhambra-patronato.es/> -> English -> Culture -> Educational Programme, and also -> Archives and Library.

⁵ UNESCO declared on the 1st. of november 1984 the Alhambra and Generalife World Heritage.

⁶ See in <http://www.granadadigital.com/> -> "Buscar" -> "Rey Chico" and read (only in Spanish)"Más tinta sobre el Rey Chico, Editorial, 5/19/2002", "La apertura del Rey Chico, prevista para octubre, se retrasa hasta el año próximo, Ayuntamiento, 5/19/2002" ", "Ultiman los trámites para reducir el volumen del Rey Chico, Ayuntamiento, 5/7/2002" ", "E l Rey Chico acogerá el Centro Andaluz de Artes Escénicas en octubre, Ayuntamiento, 2/25/2002", "Dejades con el patrimonio público, Editorial, 1/16/2002".

landscapes etc... indicate the level of legal protection it has been established, either by the state, the regional or the local authorities, and the dates in which it has been done⁷.

There is also information on the Ministry itself, now gathering the former Ministries of Education, Culture and Sport. It is also the main source for official information as it appears in its Guide of Cultural Services, "*Guía de Servicios Culturales*", and its sections for Directorate-Generals of Fine Arts, "*Dirección General de Bellas Artes y Bienes Culturales*", Archives and Museums like "*Museo Nacional del Prado*", "*Museo Nacional Centro de Arte Reina Sofía*", "*Dirección General del Libro, Archivos y Bibliotecas*", "*Biblioteca Nacional*", "*Dirección General de Cooperación y Comunicación Cultural*", with links to their web-sites⁸. Many international links with the European Union, UNESCO and Spanish speaking countries (OEI, "*Organización de Estados Iberoamericanos para la Educación, la Ciencia y la Cultura*"), are located in a section of Related Links, "*Direcciones de Interés*". Most of the information provided is in Spanish⁹.

A wider information on Heritage can be found in the web-site corresponding to the Directorate-General of Fine Arts, with links with International Institutions and the European Commission or with Associations, such as the Friends of Castles Association, "*Asociación Española de Amigos de los Castillos*"¹⁰

At the request of the Directorate-General of Education and Culture of the European Commission, the Spanish Ministry of Culture has installed in its web-site a Cultural Contact Point, a device set up in each of the Member States of the European Union with the aim of centralising the information about the calls for the grants for Programme "Culture 2000" with the possibility of looking for partners through it¹¹.

In Spain the responsibilities of the preservation of the Heritage is shared by the State with Regional Authorities. In *Andalucía*, as an example, there is a database on the Central Areas of Historic Cities, "*Base de Datos de Centros Históricos*", created by the Documentation Center of the Andalusian Institute for Projection of Heritage, IAPH "*Instituto Andaluz del Patrimonio Histórico*", which has been done with the aim of protecting the City Center of the Historic Towns in this Region and integrate the needs of the development of a living city, through sensible urban planning¹².

The State Institute for Employment, INEM "*Instituto Nacional de Empleo*", has also collaborated with private entities and companies to provide images on digital support, creating graphic databases on Spanish Art¹³.

Many public and specially private institutions like banks which are developing programs and providing funds in Spain can be located through the website of Hispanart¹⁴. There is also

⁷ Free access (only in Spanish) in: <http://www.mcu.es/bbaa/> -> *Patrimonio Histórico* -> *Bienes inmuebles*.

⁸ Free access (only in Spanish) in: <http://www.mcu.es/guia/index.html>

⁹ Free access (only in Spanish) in: <http://www.mcu.es/> -> *Otras direcciones culturales de interés*

¹⁰ Free access (only in Spanish) in: http://www.mcu.es/bbaa/textos/dir-interes/dir_interespatrimonio.html

¹¹ Free access (Spanish and English) in: <http://www.mec.es/> -> *Punto de Contacto Cultural*.

¹² More about it can be found (in Spanish) in "*Ciudad y patrimonio*" by Román Fernández-Baca, Director of IAPH, *Junta de Andalucía*, in "*Vivir las ciudades históricas. Urbanismo y Patrimonio histórico*", Seminar, Avila, may 1999 (p. 253-264).

¹³ It is possible to visit a database (free access) with fotos and a short notice in Spanish, of the UNESCO's declared World Heritage located in Spain, with the dates, in: <http://www.adesaoc.com/patrimo/arriba.html> -> *Patrimonio de la Humanidad* -> *España*. More detailed information in the book: "*La España Patrimonio de la Humanidad*", Federico Puigdeval. Ed. Rueda. Madrid, 1994.

information about grants, fellowships and other relevant information, on events (“*Eventos*”), newspaper articles (“*Resumen de prensa*”) or interesting links (“*Enlaces de interés*”).

The possibility of a “virtual visit” to Spanish museums has been developed some years ago in video or CD format. Now it is possible a free access through Internet to some of our Royal Palaces, *Madrid, El Escorial, El Pardo, Aranjuez*¹⁵ or our Museum of Money and Coins “*Museo Casa de la Moneda de Madrid*”¹⁶, where the exhibitions can also be seen.

3. INCREASING THE INVOLVEMENT OF NEW GENERATIONS

3.1 Rediscovering Vernacular Heritage: a Programme to recover abandoned villages “*Programa de Recuperación de Pueblos Abandonados*”.

In 1984 three Ministries (Education, Public Works and Agriculture) started in Spain a Programme to recover abandoned villages called “*Programa de Recuperación de Pueblos Abandonados*”, as educational working camps for young people, high school and university students. These old villages were deserted by their inhabitants; at that moment and for different reasons, they were owned by the State. The three sites were chosen for their environmental qualities, and as examples of vernacular architecture in different areas of Spain: Umbralejo, in Ayllon’s Sierra, in the province of Guadalajara; Granadilla, in Cáceres; and Búbal in Huesca. Each year it is more successful¹⁷. The Construction and Technology Department of the Polytechnic University of Madrid has send its students several years to this programme and has done publications and some videos of the experience.

3.2 Recovering craftsmanship: “*Escuelas Taller*”.

Some of the traditional crafts in Spain were lost due to the use of industrial manufacturing techniques. In building construction, it became difficult in the 70’s and 80’s to find experienced stone masons or carpenters for restoration. The architects were no longer learning about these skills during their studies in universities. As both practical and theoretical knowledge were not being taught, the maintenance of some historic buildings was at risk, as some non compatible techniques began to be used.

To recover these crafts and to create new jobs, the State and the City Councils began to collaborate in the “*Escuelas Taller*”. Young workers were getting trained and worked under supervision in the restoration of historic buildings. When they finished their training period, they could find private owned companies to maintain and repair buildings as many other constructions in Spain were erected with these techniques. Some even created their own business. A similar idea was already done in other European countries such as Germany or France. Some statistic data about the increasing number of craftsmen being trained in such schools can be found in INEM’s database and checked through Internet¹⁸.

¹⁴ <http://www.hispanart.com/> -> *Instituciones* and also -> *Becas* for grants anf fellowships.

¹⁵ For virtual visits of the Royal Palaces: <http://www.patrimoniacional.es/visitas/vvirtual.html>. There is also information on the Libraries of the Royal Palace of Madrid and its General Archive, and of The Monastery of *El Escorial*.

¹⁶ <http://www.fnmt.es/esp/museo/visita.html>

¹⁷ Information on this Programme (in Spanish) can be found in: <http://www.mec.es/becas/becas.html> -> *Programas y premios* -> *Programa de Recuperación y Utilización Educativa de Pueblos Abandonados*

¹⁸ Information on this Programme (in Spanish) can be found in: <http://www.inem.es/ciudadano/etco/indetyco.html> -> *Estadísticas* see also -> *Información General* also -> *La*

Some short term training courses have developed around these public supported Craft Schools with private investment, and in some cases with financial help from employment programs.

Last summer, as an example, several one week courses were taught in two different cities: León and Avila. The subject were: Lime mortar rendering techniques ("*Artes de la Cal*"), Decorated interlace wooden structures ("*Carpintería de armar*"), Basic course for stone masons ("*Cantería básica*"), Artistic forge ("*Forja artística*"), Wood carving ("*Talla en madera*"), Gilded and silver-plated techniques ("*Dorado y Plateado*"). There have been other courses in spring 2002 like a Specialised course on "mudejar" wood carpentry ("*Curso práctico de iniciación a la carpintería de armar: armaduras llanas de cintas y saetinos, calles de estrellas y labor de menado*"), an Advanced stone masonry techniques for restoration ("*Curso práctico de cantería: técnicas de labra, estereotomía, puesta en obra y restauración*"), an Advanced lime mortar techniques ("*Técnicas de la cal: estucos y pintura a la cal*"). Information of these courses can be found on web-sites of the organising entities: "*Escuela Taller de Leon*"¹⁹, one of the most successful Crafts Schools in Spain, and "*Fundación Cultural Santa Teresa*"²⁰, a private institution responsible for many cultural activities in Avila, both with very interesting publications on traditional crafts.

In the north of Spain, "*Fundación Santa María de Albaracín*" has also a programme of courses on restoration, from one, two or three months to nine months. They collaborate with the Spanish Institute for Historic Heritage, "*Instituto de Patrimonio Histórico Español*", and the Regional Authorities "*Gobierno de Aragón*".²¹ They are contributing to recover the Patrimony of one of the areas with less economic revenue in Spain and a decreasing population, "*Teruel*", with small medieval towns like Albaracín where the Foundation is located. With their activities, tourism is beginning to create new possibilities for the inhabitants of these small cities.

3.3 University degrees and Masters.

In the programmes of some Universities in Spain Heritage Conservation specialised subjects are beginning to be a part of the curriculum.

In Polytechnic University of Madrid, students can select some of these when studying Architecture, "*Arquitectura*" (a five years degree) or other related studies existing in Spain called "*Arquitectura Técnica*" (a three years degree, non related to design but to construction techniques). They can also follow these specialisation when they finished, either in a Master degree (MRP) or in Doctorate courses²².

The first Master in Spain related to Heritage Restoration and Rehabilitation is the "*Master en Restauración y Rehabilitación del Patrimonio*" organised by the University of Alcalá, a year and a half long, with five areas which can also be followed as Specialised Courses:

1. Theory and History of Restoration ("*Teoría e Historia de la Restauración*").
2. The Conservation and Intervention Project ("*El Proyecto de Conservación e Intervención*").

aportación de las Escuelas Taller y Casas de Oficios al Patrimonio Arquitectónico.

¹⁹ The web-site of "*Escuela Taller de Leon*" can be found in: <http://www.edeoficios.com/>

²⁰ The web-site of "*Fundación Cultural Santa Teresa*" can be found in: <http://www.fundacionsantateresa.edu/>

²¹ The web-site of, "*Fundación Santa María de Albaracín*" can be found in: <http://www.fundacionsantamariadealbaracin.com/>. Shorter courses on Restoration of altarpieces, painting, gold and silver work, archaeological materials, documents, clothes. Longer courses on the restoration of the areas of "*Torre Blanca*" and "*Iglesia de Santa María*" or "*Ermida de San Juan*".

²² More information (in Spanish) in Polytechnic University of Madrid web-site: <http://www.aq.upm.es/co/>

3. Construction Techniques and Systems (“*Procedimiento y Técnicas Constructivas*”).
4. Restoration and Conservation Techniques (“*Técnicas de la Restauración y Conservación*”).
5. Patrimony Management. (“*Gestion del Patrimonio*”).

This last one is been considered in Spain increasingly important, as a number of Projects show that the success of an intervention in the Patrimony is usually related to a good management²³.

There are international agreements for graduate, postgraduate and doctorate studies in Spain with Latin American universities, with grants and fellowships for students and professors. Some are organised through the Agency for International Collaboration, the AECI (“*Agencia Española de Cooperación Internacional*”).

3.4 International collaboration.

The Spanish Agency for International Collaboration, the AECI (“*Agencia Española de Cooperación Internacional*”) was created in 1988 in the State-Secretariat-General for International Cooperation and Latin America (“*Secretaría de Estado para la Cooperación Internacional y para Iberoamérica*”) to coordinate actions of different Ministries related to specific projects. Its Programme for Preservation of Cultural Patrimony in Latin American countries (“*Programa de Preservación del Patrimonio Cultural en Iberoamérica*”) started in the beginning of the 80’s with isolated interventions, took a new turn in 1989 with the activities related to the commemoration of the Five hundred years of the Discovery of America, and the participation of the Agency in the State Society created for this purpose (“*Sociedad Estatal Quinto Centenario*”). Two lines were defined, one to recover the economic activities in Historic City Centers (“*Revitalización de los Centros Históricos*”) and the other for the Restoration of Monuments (“*Restauración de Monumentos*”). AECI collaborates since 1990 with INEM to share the Spanish experience of Crafts Schools (“*Escuelas Taller*”) with Latin America, also related to this Programme²⁴.

Other Institutions have developed projects related to recovering the Patrimony as a way to introduce economic activities in possible touristic areas. Eight students on the last year of “*Arquitectura Técnica*”, had worked for three months in rehabilitation of buildings in the old city center of the towns of Essaouira (Morocco), Saida (Libya) and Guadalajara (Mexico). Most of their work was related to study the building, drawing plans and elevations, detailing its materials and construction systems, and explaining its pathologies. This Project, started in 1997, is included in the UNESCO Programme of Urban Development and Water Resources for Small Coastal Towns, “*Developement urbain et ressources en EAU: Petites Villes Cotières*”, with the collaboration of PREMAAT and EUATs.²⁵

4. RESEARCH AND ARCHITECTURAL PRACTICE: OLD AND NEW TECHNIQUES.

4.1 Applied knowledge and learning from our mistakes: The recovery of lime mortars and “*esgrafiado*” techniques

²³ More information (in Spanish) in their web-site: <http://www.masterpatrimonio.edu/>

²⁴ More on this Programme can be found (In Spanish) in the book “*Programa de Preservación del Patrimonio Cultural de Iberoamérica*”. Ed. Agencia Española de Cooperación Internacional. Madrid, 1999.

²⁵ More information (in Spanish) in the article “Proyecto conjunto de la UNESCO, PREMAAT y las EUATs. Estudiantes participan en tareas de rehabilitación en Marruecos, Líbano, y México”, *Cercha* n° 47, dic. 98 (p. 62-63)

Some of the ideas of XIX th. century restoration criteria of recovering the “true” image of art, combined with others of the XX th. century “Modern” architecture have lead to the destruction of historic renders in Spain.

In the last twenty years some architects are trying to fight this tendency and recover those renders, often done with lime mortars. The variety of techniques and patterns and their colours have changed the recent image of some buildings and cities, bringing back its past splendour. A turning point in this attitude has been shown by the book of Ignacio Gárate Rojas “*Artes de la Cal*”²⁶ (Lime mortar rendering techniques); since its publication in 1993, based on the research of the author on historic mortars and his practical knowledge due to the restoration of many buildings, the destruction of renders in building facades is widely considered a mistake.

The activity of “*Escuelas Taller*” has provided some experts in rendering with lime mortars or repairing them, other doing the same with stone decorations. But, as they are being used more and more, some small specialised companies using the old techniques of “*esgrafiado*” are providing training courses²⁷.

4.2 The importance of finding historic data, studying them and giving a technical interpretation: a forgotten technique for Decorated interlace wooden ceilings and structures, “*Carpintería de Lazo*”.

There is a spectacular wooden ceiling in the Alhambra Palace in Granada, in Comares Tower built with a peculiar Spanish Technique called “*Carpintería de Lazo*”, covering the room called “*Sala de la Barca*”²⁸. It is a reconstruction of the XXth. century to recover the existing one burned at the end of the XIXth. century. The difference with similar shapes done in other areas of Spain is that it is a decorative pattern, like some similar examples in the north of Africa, but not a structure bearing loads. As professor Enrique Nuere Matauco points out some of these decorated wooden ceilings not only adorn rooms but also act as supporting structures. Evidence of this is to be found in the structures that cover Teruel Cathedral built at the end of the 13th. century, the *Sefardí* Museum at Toledo built in mid. 14 th. century²⁹.

The involvement of Enrique Nuere with these wooden roofs began when he was asked as an architect to install some old structures, disassembled and stored in different warehouses of Alhambra, in the Spanish-Muslim Museum of Granada. Some of these pieces were there for more than a century without being on display, according to the museum register, as they have been removed during conservation work in Alhambra; from some others, there was no reference at all about their origin. The first task was to try to understand this “puzzle” with the help of an old book called “*Reglas de carpintería de lo blanco, de Diego Lopez Arenas*”, which has to be studied by the architect. To erect these structures, some of the possible alternatives were then considered with the help of a computer. This extraordinary task was awarded the prestigious price “*Marques de Lozoya*” in 1982³⁰.

²⁶ Ignacio Gárate Rojas “*Artes de la Cal*”. Ed. Instituto de Conservación y Restauración de Bienes Culturales. Madrid, 1993.

²⁷ Like “Rehabilitación de fachadas. Morteros de cal” a course about recovering lime mortar facades by the company Julio Barbero (<http://www.juliobarbero.com/>) or “MPA laser. Tratamiento de superficies en entorno urbano por proyección de abrasivos y por laser”, a course on the techniques used to clean urban facades by MPA.(<http://www.mpa.es>).

²⁸ A drawing of these ceilings can be found in his book: “Nuevo tratado de la carpintería de lo blanco y la verdadera historia de Enrique Garavato carpintero de lo blanco y maestro del oficio, todo escrito y dibujado por Enrique Nuere” Ed. Munilla-Lería. Madrid, 2001

²⁹ Some of these techniques are used in modern ceilings, as can be seen in Taujel Web-site: <http://www.taujel.com/>

³⁰ More can be found in “Artesonados del museo Hispanomusulman” from the book “Intervenciones en el

This theme is being used in post graduate courses and doctoral studies and has already been a research line of the thesis on Spanish eaves and cantilevers with Islamic influence. Types of Spanish eaves up to the XVII century: evolution and influences (*"Aleros y voladizos españoles con influencia islámica. Tipología de aleros españoles hasta el siglo XVII: evoluciones e influencias"*), by María de Valvanera Cámara, and on Wooden roof structures in the region of Leon: documents and criteria for the analysis. Classification and evolution of structural types in the region of Leon (*"Armaduras de cubierta en la región leonesa: bases documentales y criterios para el análisis. Clasificación y evolución de las tipologías estructurales de cubierta en la región leonesa"*), by Miguel Fernandez Cabo³¹.

4.3 Mathematical and graphic models and reality: checking the movement of masonry structures and assessing its stability.

Preventive conservation to avoid damages produced by earthquakes is beginning to be a practice, which may not be very widespread yet, but considered in relation to recent problems created in much of the important Heritage Patrimony of Italy, Greece, Turkey or Latin America.

One of the techniques considered is to design mathematics models to study the stability of buildings under seismic loads and reinforce them if the analysis previously done recommends it. Unfortunately, the real behaviour of stone or brick masonry does not always correspond to these previsions.

One of the problems may be the lack of accurate studies of the buildings under dynamic loads. In Spain studies of several monuments under windloads are becoming more frequent. Devices to measure deformation of masonry in several points and send data to a control computer have been operating in Segovia Roman Aqueduct and some gothic cathedral towers like those of Burgos, Leon and Sevilla. In the later one, a repair would be done in two central pillars of the main nave. The control of deformation and stress produced by this work will be computer controlled so any movement will be stopped if an excess of deformation or stress is detected ³².

4.4 The limits of modern technologies: stone masonry reinforced by concrete shells or resin mortars.

The behaviour of composite structures created in restorations of stone masonry buildings with reinforced concrete, done in the XXth. century in Spain, have to be studied. Some of our Gothic period monuments have already shown problems for example a covered market called "*La Lonja*" in Mallorca. There are still few studies about it, while at the same time these techniques are still used, as in the Roman theatre in Sagunto, near Valencia. Other monuments like Segovia Aqueduct have been reinforced both with reinforced concrete and resin mortar ³³.

Patrimonio Arquitectónico, 1980-1985" Instituto de Conservación y Restauración de Bienes Culturales. Ed. Ministerio de Cultura. Madrid, 1990.

³¹ Prof. Enrique Nuere gives lectures in Madrid "*Universidad Politécnica*" in "*Historia de la Construcción*" (<http://www.aq.upm.es/diga/asignatura/historia/historia.html>) and "*Programa sobre Conservación y Restauración del Patrimonio Arquitectónico*" (<http://www.aq.upm.es/master/construcción.html>). The thesis references can be found in the database of the Polytechnic University Libraries and can be found in Internet in: <http://www.upm.es/> - > *Servicios* - > *Bibliotecas* - > *Bases de datos*

³² Some Departments of the Polytechnic Universities of Madrid or Sevilla and companies such as Dragados/Geocisa, Intemac or Kinesia are collaborating in these studies.

³³ The last intervention in Segovia's Roman Aqueduct has been provoked by the decay of its granite stone related to the heavy traffic crossing under its arches. But the damages were greater due to the discharge of the arches by reinforced concrete beams done 25 years before which increased vibration of the voussoirs forming the arches.

These non-reversible interventions should be done, of course, if they are needed taking into consideration the stability of the monument. But more research has to be done in order to study the behaviour of these composite structures to avoid further problems.

5. CONCLUSIONS: THE POSSIBILITIES OF NEW TECHNOLOGIES.

Under the name of “New Technologies” many innovative methods can be found. Most of the contents of this paper are related with Communication or with the transmission of our Cultural Heritage. I think this is a basic factor to preserve World Patrimony and to integrate our past in our everyday way of life without destroying it.

But as Communication is only a very effective tool we can use, we have to find some ideas to give a meaning to our activities. Knowledge of a variety of cultural patterns can give a wider mind and teach people how to appreciate their own cultural background. The participation in International projects may give individuals a sense of collaborative work and a better understanding of Art, if focused on recovering their Patrimony or helping others to do so, sharing previous experiences. The involvement of younger generations in the process of finding the necessary solutions, will help them to develop their personality as well as bringing creative approaches to it. This will be necessary for finding a New idea of European Heritage which integrates the multiplicity of cultures sharing our continent.

The tool new technologies of communication provide is powerful. It may help to a wider access to knowledge of Cultural Heritage, as well as reducing the risk of its destruction, as many individuals will try to avoid it, sharing the essential meaning it conveys.

Lets see what we can do with it.

6. REFERENCES

References have already been included in the text.

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