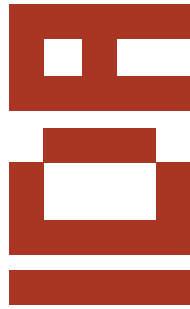


SEVILLA

IDA

**IDA: ADVANCED
DOCTORAL RESEARCH
IN ARCHITECTURE**

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DOCTORAL RESEARCH
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Antonio Tejedor Cabrera, Marta Molina Huelva (comp.)

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FORMATO

Mesas temáticas

Las mesas temáticas son lugares de presentación de las metodologías y las experiencias de jóvenes doctores y de estudiantes de doctorado procedentes de las diferentes universidades. Son gestionadas por los propios estudiantes de doctorado que generan unas conclusiones para ser debatidas y reelaboradas en la sesión plenaria final. Las sesiones se desarrollan de manera simultánea con la presentación de los *papers* seleccionados en la *call*, organizados en cuatro áreas o líneas temáticas:

1. Tecnologías de la Arquitectura
2. Vivienda, Ciudad y Territorio
3. Patrimonio y Rehabilitación
4. Análisis y Proyectos Avanzados

Taller

El workshop del Congreso se orienta hacia el análisis de los problemas y las necesidades de gestión de los Programas de Doctorado con el fin de extraer conclusiones que pueden ser útiles a las Universidades implicadas. En el workshop participan los coordinadores de los programas de Doctorado en Arquitectura y los representantes de los doctorandos. Son temas de debate: las líneas de investigación, las metodologías, las necesidades organizativas de los programas de doctorado, el Doctorado Internacional y el Doctorado Industrial, y el futuro de la investigación doctoral.

Sesiones Plenarias

Las sesiones plenarias se realizan al inicio y al final del Congreso. En la primera sesión de bienvenida e introducción al Congreso se invita a participar a expertos investigadores del panorama nacional e internacional y a los coordinadores de los programas de doctorado. En la segunda sesión plenaria se propone un debate abierto para la reelaboración de las propuestas extraídas del taller y de las mesas temáticas. Sirve también de clausura con la presentación de las conclusiones finales del Congreso IDA_Sevilla 2017.

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FOREWORD

The Instituto Universitario de Arquitectura y Ciencias de la Construcción (IUACC), in collaboration with the Escuela Técnica Superior de Arquitectura (ETSAS) and the Escuela Internacional de Doctorado (EIDUS) of the University of Seville are pleased to welcome the heads of research from both Spanish and overseas universities, consolidated researchers and young doctoral researchers to the First International Congress of Doctorates in Architecture IDA Sevilla, from 27th to 28th November 2017.

The **IDA_Sevilla 2017** Congress offers a general perspective of doctoral studies in the field of Architecture and its related disciplines: urban planning, heritage, landscape, construction technologies and sustainability. In the new context generated after the elimination of the doctoral programs prior to RD 99/2011, it is necessary to carry out an analysis of the complex panorama that the former programs and the new doctoral programs have drawn up, in order to know in detail both what has been achieved so far, as well as the challenges of the future of advanced doctoral research in Spain, in the European and international context.

The startling changes that are taking place in our society call for a vision of research that is not compartmentalised into traditional disciplines or areas of knowledge. Doctoral research in Architecture must adapt to changes in society and to the sustainable productive needs of territory.

The congress will take place at the Escuela Técnica Superior de Arquitectura de Sevilla, organised in four simultaneous thematic tables, a workshop on the administration of doctoral programs and two plenary sessions.

The **thematic tables** are aimed at young doctors and doctoral students of the different participating universities who will present their experiences and methods of their research - in development or recently concluded. The participation in the thematic tables is carried out through the selection procedure with blind peer review established in the call for papers and through express invitations to the debate. The almost 70 communications have been structured in four thematic areas representative of the PhD programs in Architecture.

The **open workshop** will be held in two sessions with the participation of the coordinators of each of the collaborating programs of the Congress, and professors with extensive doctoral experience. Its objectives are multiple: to discuss the experiences undertaken in the different universities, exchange ideas about the approaches and models applied, address the challenges of internationalization and management, launch the new Industrial Doctorate with companies and public agencies, and so on.

There are two **plenary sessions**: one, a plenary session of introduction to the congress, with the participation of coordinators of national and foreign doctoral programs; and a closing plenary session, with an open debate for the going-over of the conclusions drawn from the thematic tables and the workshop, and the presentation of final conclusions.

We thank the Escuela Internacional de Doctorado of the University of Seville, and the Escuela Técnica Superior de Arquitectura de Sevilla for the support they have provided for the holding of this meeting, which contributes so much to the clarification of the future of doctoral studies in Spanish universities in the face of the great challenge of internationalization and the continuous improvement of the quality of research in Architecture. We also thank those responsible for the participating Doctoral Programs, the Architecture library of the US and all the participants and attendees.

Antonio Tejedor Cabrera
Marta Molina Huelva

PRÓLOGO

El Instituto Universitario de Arquitectura y Ciencias de la Construcción (IUACC), con la colaboración de la Escuela Técnica Superior de Arquitectura (ETSAS) y la Escuela Internacional de Doctorado (EIDUS) de la Universidad de Sevilla, se complacen en recibir a los responsables de investigación de universidades españolas y extranjeras, a los investigadores consolidados y a los jóvenes investigadores de doctorado en el I CONGRESO INTERNACIONAL DE DOCTORADOS EN ARQUITECTURA IDA_Sevilla, del 27 al 28 de noviembre de 2017.

El congreso **IDA_Sevilla 2017** ofrece una perspectiva general de los estudios de doctorado en el campo de la Arquitectura y sus disciplinas afines: urbanística, patrimonio, paisaje, tecnologías de la construcción y sostenibilidad. En el nuevo contexto generado tras la extinción de los programas doctorales anteriores al RD 99/2011 es necesario realizar un análisis del complejo panorama que han construido los programas extintos y los nuevos programas de doctorado, con el objeto de conocer con detalle tanto lo conseguido hasta ahora como los retos que depara el futuro de la investigación doctoral avanzada en España, en el contexto europeo e internacional.

Los vertiginosos cambios que se están produciendo en nuestra sociedad reclaman una visión de la investigación no compartimentada en disciplinas o áreas de conocimiento tradicionales. La investigación doctoral en Arquitectura debe adaptarse a los cambios de la sociedad y a las necesidades productivas sostenibles en el territorio.

El congreso se celebra en la Escuela Técnica Superior de Arquitectura de Sevilla organizado en cuatro mesas temáticas simultáneas, un taller sobre la gestión de los programas de doctorado y dos sesiones plenarias.

Las **mesas temáticas** están dirigidas a los jóvenes doctores y a estudiantes de doctorado de las diferentes universidades participantes que exponen sus experiencias y métodos sobre las investigaciones en desarrollo o recientemente concluidas. La participación en las mesas temáticas se realiza por el procedimiento de selección con revisión por pares ciegos establecido en la *call for papers* y por medio de invitaciones expresas al debate. Las casi 70 comunicaciones se han estructurado en cuatro áreas temáticas representativas de los programas de doctorado en Arquitectura.

El **taller** de puesta en común se realiza en dos sesiones con la participación de los coordinadores de cada uno de los programas colaboradores del Congreso y de profesores con amplia experiencia doctoral. Sus objetivos son múltiples: debatir sobre las experiencias desarrolladas en las distintas universidades, intercambiar ideas sobre los enfoques y los modelos aplicados, abordar los retos de internacionalización y de gestión, poner en marcha el nuevo Doctorado Industrial con empresas y agencias públicas, etc.

Las **sesiones plenarias** son dos: una sesión plenaria de introducción al congreso, con la intervención de coordinadores de programas de doctorado nacionales y extranjeros; y una sesión plenaria de clausura, con un debate abierto para la reelaboración de las conclusiones extraídas de las mesas temáticas y del workshop y la presentación de las conclusiones finales.

Agradecemos a la Escuela Internacional de Doctorado de la Universidad de Sevilla y a la Escuela Técnica Superior de Arquitectura de Sevilla el apoyo que han proporcionado para la realización de este encuentro que tanto contribuye a clarificar el futuro de los estudios doctorales en las universidades españolas ante el gran reto de la internacionalización y la continua mejora de la calidad de la investigación en Arquitectura. Damos las gracias también a los responsables de los Programas de Doctorado participantes, a la Biblioteca de Arquitectura de la US y a todos los participantes y asistentes.

Antonio Tejedor Cabrera
Marta Molina Huelva

OBJECTIVES

1. Analyze the research lines of the various programs and build a map of doctoral research in Spain with the support of coordinators, tutors / thesis supervisors, doctoral students and young doctors in the disciplines related to Architecture and their related areas.
2. To know the status of doctoral theses in progress or defended in the last three years, selected by means of a call with blind peer evaluation of the doctoral programs participating in the congress.
3. Discuss the structure and university management of doctoral programs in relation to employment challenges, collaboration with the productive sector and national research programs.
4. Exchange experiences with other international doctoral research programs on international mobility management, theses with international mention, co-supervised theses, theses with industrial mentions, etc.
5. No less important, consolidate a national and international network of Doctoral Programs related to Architecture, Urban Planning, Heritage, Landscape, Technologies and related disciplines.



LT 1

ARCHITECTURE
TECHNOLOGIES

LT 2

HOUSING, CITY
AND TERRITORY

LT 3

HERITAGE AND
REHABILITATION

LT 4

ANALYSIS AND
ADVANCED PROJECTS

FORMAT

Thematic tables

The thematic tables are places to present the methodologies and experiences of young doctors and doctoral students from different universities. They are managed by the doctorate students themselves, who generate conclusions to be debated and reworked in the final plenary session. The sessions are developed simultaneously with the presentation of the papers selected in the call, organized in four areas or thematic lines:

1. Architectural technologies
2. Housing, city and territory
3. Heritage and Rehabilitation
4. Analysis and advanced projects

Workshop

The workshop of the Congress is oriented towards the analysis of the problems and management needs of the Doctorate Programs, with the objective of arriving at conclusions that may be useful to the Universities involved. The coordinators of the Doctorate in Architecture programs and the doctoral students' representatives will participate in the workshop. The following are topics for debate: lines of research, methodologies, organizational needs of the doctoral programs, the International Doctorate and the Industrial Doctorate, and the future of doctoral research.

Plenary Sessions

The plenary sessions are held at the beginning and end of the Congress. In the first session of welcome and introduction to the Congress, researchers from the national and international scene and the coordinators of the doctorate programs are invited to participate. In the second plenary session an open debate is proposed for the going over of the proposals drawn from the workshop and the thematic tables. It also serves as a closing ceremony with the presentation of the final conclusions of the 2017 IDA_Sevilla Congress.

OBJETIVOS

1. Analizar las líneas de investigación de los diversos programas y construir el mapa de la investigación doctoral en España con el apoyo de los coordinadores, los tutores/directores de tesis, los doctorandos y los jóvenes doctores en las disciplinas relacionadas con la Arquitectura y sus áreas afines.
2. Conocer el estado de las tesis doctorales en marcha o defendidas en los últimos tres años, seleccionadas por medio de una *call* con evaluadores por pares ciegos de los programas de doctorado participantes en el congreso.
3. Debatir sobre la estructura y la gestión universitaria de los programas de doctorado en relación con los retos de empleo, colaboración con el sector productivo y los programas nacionales de investigación.
4. Intercambiar experiencias con otros programas de investigación doctoral a escala internacional sobre gestión de la movilidad internacional, tesis con mención internacional, tesis en cotutela, tesis con mención industrial, etc.
5. No menos importante, consolidar una red nacional e internacional de Programas de Doctorado relacionados con la Arquitectura, la Urbanística, el Patrimonio, el Paisaje, las Tecnologías y sus disciplinas afines.



ICR

SEVILLA

LT 1

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LA ARQUITECTURA

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ANALYSIS OF INCIDENCE OF LICENSE MANAGEMENT ACTIVITIES IN THE PROCESSES OF THE INTERNATIONAL STANDARD UNE ISO 21,500

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Abstract: The International Standard UNE ISO 21,500 is a compendium of the best practices of Project Management standards that are implemented at a global level, in a process of identification of procedures and a common language, in such a way as to facilitate and enhance the collaborations between countries.

The Standard establishes the processes of the project according to two points of view, that is, by Subject Groups and Process Groups, and which are applied to all types of projects. This work is done after analyzing the incidences of the activities related to the Licensing Management of 27 building projects built in the city of Madrid. In view of the result, it identifies the activities of Licensing and Authorizations Management of special relevance, being involved in practically all the processes established in the International Standard UNE ISO 21500, and having implications in all phases of the Life Cycle of the Building Project. Because of its importance, we propose the identification of Licensing and Authorization Management as a new Area of Knowledge within the International Standard, identifying the processes assigned to a new Subjects Group.

Keywords: License Management, Project Management, Construction Management, ISO 21500, Architecture.

1. Introduction

In the development of the Building Project the activities of Licensing Management are shown of vital importance, and of their correct performance depends to a great extent the success of the investment, and the attainment of the initially proposed objectives.

The possible shortcomings in the processes produce an incidence of different consideration, with a degree of impact of great depth, and of increasing magnitude as the project advances in its development, coming to produce effects that can bring down the final results.

The development of the professional activity indicated to us the existence of a lacuna in the form to focus the activities of Licenses Management in the edification projects. For this reason, and in the framework of the research work of Doctoral Thesis, we analyze a number of projects, as wide as possible, regarding the incidences in their development, that is, throughout their life cycle.

We realize that the activity of the role of the Licensing Manager goes beyond the mere administrative management of the permits and authorizations processing, and encompasses processes of control of compliance with both urban and technical regulations, so that it is linked to global management of the building project from the moment of conception to its delivery.

From the above analysis, an average impact of 11.27% of the investment is estimated, being higher than 10% in 40.7% of the analyzed samples, and higher than 15% in 25.9% of the samples.

These activities have traditionally been considered as part of the role assigned to technical staff, without taking into consideration their degree of involvement with the company's objectives, and especially without a specific management preparation.

For this reason we resolve to consider the Licensing Management as a set of activities with own consideration, and of strategic importance for the objectives of the building project.

In order to optimize the results of the Project, we apply the techniques of Integrated Project Management, as Professor Manuel Soler Severino points out, with a global concept of activities and a proactive management system that allows us to analyze new situations by taking advantage of Our experience, and being ambitious in the objectives of the Project.

The activities of Licensing Management affect practically all the processes related and defined in the International Standard UNE ISO 21500, reason why, due to its importance, we proceed to analyze the implications of the License Management in each Group of Processes of the Standard, from the initial point of view of the GL as a group of activities developed by a specific manager and with a pre-established role in the project team, to finally propose the introduction of a new Material Group called Licensing and Authorizations Management.

2. General conclusions of the analysis performed

From the analysis of the building projects, we can conclude the incidents associated with aspects related to the role of the license manager, identified in the different stages of their life cycle, In order to do this, we first identify some type phases, which serve as the basis for the study, and which are considered as starting standards both in the PMBoK, developed by the Project Management Institute, and by the international standard UNE ISO 21,500.

- Strategic definition.
- Planning.
 - Design.
 - Previous license.
- Construction or execution.
- Closing.

In the Planning phase, the study is divided into two distinct parts, that is Design and Licensing, understanding as such the process of requesting and processing the work license prior to the beginning of the works, for the interest that the specific problem, being the majority of the projects analyzed of a use that corresponds to a procedure of previous license.

The analysis shows, inter alia, the following conclusions:

- In the Strategic Definition phase, incidences equal to or greater than 3 months are identified in 25.9% of the projects, of which 14.8% of the projects have incidences equal to or greater than 5 months.
- In the Planning phase, incidences of more than 3 months occur in 63.9% of the projects analyzed, equal to or greater than 5 months in 40.7%.
- In the Execution phase, incidences are greater than 10 months in 14.8% of cases.
- In the Closing phase, incidences of more than three months occur in 40.7% of the projects, and of these, in 7.4% will be over 10 months.

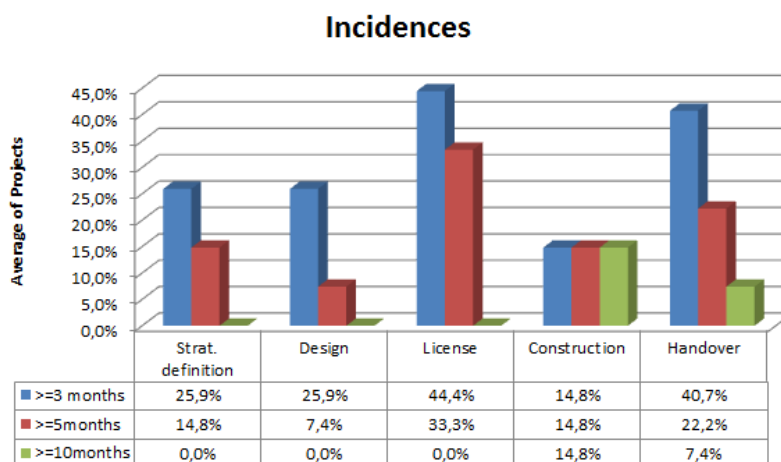


Fig- 1 Percentages of samples with incidents Source: Own elaboration

- It is worth mentioning the degree of impact of the incidences related to the Management of Licenses as a percentage of the investment, and in that we see that between the high, very high, and critical grades, which would cover an incidence higher than 10% of the investment , we appreciate it in 44.43% of the projects analyzed.

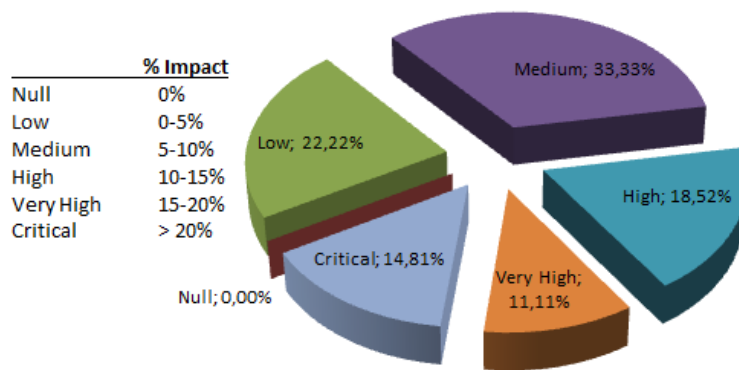


Fig. 2 Impact Level of the incidences related to the License Management Source: Own elaboration

3. The International Standard ISO 21,500

The International Standard UNE ISO 21500 arises within the framework of a spirit of impulse to the economic activity at international level, through resolutions that facilitate the opening of markets. It includes the best practices already included in other standards already applied locally in different countries, and processes and orders the processes in order to facilitate the coordination of all the interested parties involved in the building project, optimizing the processes that develop it , And establishing a common language, facilitating the interaction of multidisciplinary teams and different countries.

Its methodology is based on a matrix operation scheme, where the different processes have a double reading, with two points of view, either as Process Groups or as Groups of Matters

The Process Groups are applicable to each project or project phase, taking each one as if it were an independent project, and its definition to some extent can be related to the development of the project over time.

We see, in a summary form, that the activities of the License Management affect, in greater or less consideration, almost all the processes developed in the International Standard.

As we have already pointed out, we start from the basis of the activities of License Manager, as a member of the Project Team, although not yet contemplated as an agent and whose role may be performed by a highly qualified professional, and in any case compromised With the strategic objectives of the company.

Likewise we identify the activity of the License Manager in the building projects in the Spanish territory, and more concretely in the city of Madrid, although the processes have a common territorial base, it is of great importance the deep knowledge of the normative of action at level Local level, and the usual management of the procedures established by the different administrations.

It should be noted that the activities developed in the Licensing Management are interrelated, in such a way that the groups are applied jointly, having implications and consequences throughout the matrix of processes, and are applied repeatedly within each project phase.

3.1. Subject Group: Integration Management

Develop project chapter

Developed from the earliest stages of the project, it corresponds to the moments in which information is collected that allows the fundamental decision to undertake or discard it, and which establishes the baselines, the scope either total or partial or in phases , And the expected yields of the investments to be committed.

The License Manager must identify the possibilities of exploitation of the future project, its weaknesses and threats, as well as its opportunities and strengths. The best possibilities of patrimonialización of the allowed building, which will allow to the Project Director the formulation of the scope and the specifications.

Develop project plans

This process the LM identifies in advance the possibilities of the development of the project, determining the parameters for its resolution, and the parameters for its monitoring and subsequent control. In order to do this, it will use its knowledge of the different tools that make available to it the

discipline of Integrated Project Management, with the application of the different procedures that the different municipal regulations of application, as well as others of greater rank.

The Project Plan incorporates the GL as an integrated or as a subsidiary plan, to be developed by a specific work team and with a high level of training.

Direct project work

The License Manager will be integrated into the project team to be coordinated by the Project Manager in such a way that their deliverables condition and complement those of the other components of the team.

Control project work

The License Manager must also coordinate the performances of the other participants in the team, so that the results are in accordance with the licenses granted and those that are to be processed, verifying the results with the final objective (the baseline), Therefore, have sufficient decision-making capacity and authority to validate their performance, as well as to propose contingency measures to mitigate deviations. These actions must be carried out throughout the life cycle of the project, although the LM's capacity to anticipate the impacts will be decisive.

Control Changes

It is important that the Licensing Manager control the changes that may occur in the development of the project, verifying the implications that could occur in their area of activity. It must have sufficient capacity to anticipate the consequences of such change, to anticipate alternative solutions, and even veto, if necessary, its approval.

Close project phase or project

The verification of the final result of the Project requires previous actions to control the deliverables, so that in the closing processes are anticipated possible measures of action in the case of possible occurrence of deficiency.

We must take into consideration the importance of these processes, as they are those of the last stages of the life cycle, and therefore when the investments are already made, and the need for return is greater. Any uncontrolled incidence in this phase has much greater implications than any other, and therefore the processes must be the result of the activities during the execution of the project

Colect lessons learned

The Licensing Manager must have a high technical, legal and management training, and for that it is vital that you take advantage of past experiences. It will also have to identify the different degrees of impact that have occurred the possible incidences, the more the more unforeseen they have been.

3.2. Subject Group: Stakeholders Management

Identify stakeholders

This is one of the activities of major relevance within the processes of License Management. The identification of stake holders with responsibility within the municipal bodies for the processing of the files allows a clear idea of the administrative procedures, and therefore exponentially improves the chances of success of their follow-up.

The license manager must split an organizational chart in which the parties involved are perfectly identified, as well as their degree of decision and negotiation capacity, and the flow of information.

Manage stakeholders

The stakeholder concerns should also be managed in such a way that participants row in only one direction so as to provide the Project Manager regarding the monitoring baseline.

It is important to make the different stakeholders aware of the importance of achieving the final project objectives so that they are able to assess the performance of their work and the extent to which they participate in the final outcome.

Special effort should be made with the interested parties responsible for the processing of licenses and authorizations, given that these will depend to a great extent on the degree of fulfillment of the expectations of the Project Plan in terms of the development of the initially established planning.

3.3. Subject Group: Scope Management

Define scope

The GL will be part of the definition of scope of the project, being aware of the objectives of the company, as well as of the possibilities of patrimonialization of the objective buildability, and of the proposed uses.

Control Scope

Rigorous control of performance and how these are aligned with the scope of the initially proposed project, allows control of the baseline, and anticipation of incidents that may occur throughout the development of the Project.

3.4. Subject Group: Resource Management

Establish project team

The role of the Licensing Manager should be of great importance as a member of the project team due to the high professional qualifications required, including interpersonal skills as well as extensive project knowledge, construction and application of current urban and technical regulations.

For this reason, it may be a sub-contractor in the event that the organization does not have a resource with sufficient dedication capacity, and whose performance would be advisable to start in the early stages of the project, in a way that facilitates the Management of Risks

Develop project team

For a correct coordination of the project team it is necessary that the members know the functions of the rest functions, so that they are aware of the interrelationships that confer the performance of their functions.

3.5. Subject Group: Time Management

Sequence and estimate activity durations

The activities of License Management depend to a great extent on the performance of the other responsible ones, such as design, valuation or execution. According to the procedure followed for the application of the licenses, sometimes the determination of the duration of the actions of third parties are made tremendously complicated, and this lack of definition can significantly affect the results of the Project.

Develop schedule

The activities of License Management depend to a great extent on the performance of the other responsible ones, such as design, valuation or execution. According to the procedure followed for the application of the licenses, sometimes the determination of the duration of the actions of third parties are made tremendously complicated, and this lack of definition can significantly affect the results of the Project.

Control schedule

The License Manager shall monitor compliance with the baseline schedule so that it can predict possible changes to propose corrective actions that mitigate the impact.

3.6. Subject Group: Cost Management

Estimate costs and develop budget

The Licensing Management allows the Project Manager to estimate budgets adjusted to the reality, allowing to bring the objectives of the project closer to the reality of the site and the surrounding environment of the building Project.

Control costs

We must understand the relationship by observing the schedule and the evolution of the schedule, as well as in the preposition of measures that mitigate or nullify the possible risks.

Special relevance has the approval and control of project changes.

3.7. Subject Group: Risk Management

Identify risks

The Licensing Manager has the responsibility to carry out a rigorous analysis of the application regulations, both urban and technical, and apply it to the specific case of each building project, being considered as unique, being able to radically change its configuration with only small Nuances of the soil on which you intend to build, or the surrounding environment.

For this reason it is very important to include the figure of the LG from the very birth of the idea of the project, so that the risks of greater relevance that support its viability can be identified.

Assess risks

Knowing the risks involves evaluating their degree of impact on the project objectives, so that their hierarchy is feasible. And as a rule, its impact will be all the greater the more advanced the project is, arriving in the last stages, to question the initial objectives

It is important to note the risks associated with the closure phase, as the investment already made and the deliveries compromised, as in the case of the Operation and First Occupation Licenses. In these cases a lack of control of changes can have serious consequences, that is, the control during the development of the Project.

Treat risks

The proposal of contingency measures is vital in order to correctly manage risks. For this reason the Licensing Manager must have sufficient decision and veto capacity, or at least mandatory supervision, in the activities of the other components of the project team.

Control risks

Continuous and rigorous risk monitoring should be carried out during the development of the project, with particular regard to changes, whether initial or incidentally. The contingency plan should be reviewed and adapted in such a way that the final results of the project will not be affected.

3.8. Subject Group: Quality Management

Planing quality

The Project Quality Plan will be able to identify aspects related to the Management of Licenses, linked to the quality policy of the company.

Perform quality control

The monitoring of the deliverables that mark elements subject to a license already obtained must be grounds for control by the GL, in such a way as to ensure consistency with the final objective. This is the case of the industrial facilities of the buildings, which normally appear as specific control by the municipal authorities, and which then have to be legalized in departments of industry of the corresponding Autonomous Community.

3.9. Subject Group: Procurement Management

Select suppliers

It is common that most of the work is subcontracted to companies specializing in specific activities, and possible uncertainties can cause incidences in other items. The Licensing Manager should be responsible for the providers are correctly informed of the relationship of the performance of their work with the general or partial authorizations of the project as a whole.

3.10. Subject Group: Communication Management

Plan communications

The information to be provided to the different stakeholders regarding the management of licenses and authorizations will be identified, with particular relevance to the changes brought about by the adaptation of the project to the requirements of the records control entities , Whose reply must be anticipated in such a way as to avoid delays in the processing.

This point is related to the management of the stakeholders, both internal and external to the organization, so that the different teams have documentation according to what is finally allowed.

Distribute communications

It should remain available only the project information contained in the licenses obtained, taking special care to eliminate other documentation from previous versions that can lead to misunderstandings and inefficiencies.

Manage communications

Updating current information and updating with each authorized change.

4. Conclusions: Proposal for the inclusion of a new Area of Knowledge in UNE ISO 21.500: MANAGEMENT OF LICENSES AND AUTHORIZATIONS, for the building project

From all of the above, we can deduce the strategic importance of the Licensing activities, and their degree of affection in each one of the processes of the International Standard UNE ISO 21,500 previously related, so we propose the inclusion in the Standard of a NEW SUBJECTS GROUP.

For this we list the processes referred to this new Area of Knowledge, and to facilitate their understanding we identify after the Matrix of Matters of Management of Communications. These processes would be applicable to each project or project phase, although it is advisable, in the latter case the overall vision of the whole, being in most cases related

The processes of the new Group would be as follows

KNOWLEDGE AREA: LICENSING MANAGEMENT

- Process Group of Initiating:
 - Develop the LM Plan (Proposed numbering 4.3.41)
 - Identification of Stakeholders (Proposed numbering 4.3.42)

- Establish LM responsible (Proposed numbering 4.3.43)
- Process Group of Planning:
 - Revision of the Sequence of Activities and adaptation to LM (Proposed numbering 4.3.44)
 - Identifying and Assessing the Risks of LM (Proposed numbering 4.3.45)
 - Identifying LM suppliers responsible (Proposed numbering 4.3.46)
 - Review LM Communications Planning (Proposed numbering 4.3.47)
- Process Group of Implementing
 - Coordinate compliance with Project Work regarding LM (Proposed numbering 4.3.48)
 - Manage Stakeholders related to LM (Proposed numbering 4.3.49)
 - Risk Management related to LM (Proposed numbering 4.3.49)
 - Change Management related to LM (Proposed numbering 4.3.51)
 - Management of suppliers related to LM (Proposed numbering 4.3.52)
 - Communication management related to LM (Proposed numbering 4.3.53)
- Process Group of Controlling
 - Control of of proyect work related to LM (Proposed numbering 4.3.54)
 - Control of changes related to LM (Proposed numbering 4.3.55)
 - Control of Scope related to LM (Proposed numbering 4.3.56)
 - Control and manage of Resources work and their involvement in LM. (Includes training) (Proposed numbering 4.3.57)
 - Control the Schedule related to LM (Proposed numbering 4.3.58)
 - Control Costs related to LM (Including taxex and rates) (Proposed numbering 4.3.59)
 - Control of risks related to LM (Including management of changes) (Proposed numbering 4.3.60)
 - Control of comunications related to LM (Proposed numbering 4.3.61)
- Process Group of Closing
 - Management of Closing and Delivery Licensing (Including First Occupation License and Operation License (Proposed numbering 4.3.62)
 - Collect Lessons Learned from LM (Proposed numbering 4.3.63)
 - Training of Equipment in the field of LM (Proposed numbering 4.3.64)
 - Compilation of final documentation (Including the Building Book) (Proposed numbering 4.3.65)

Fig 3 Proposal of New Subject Group: LICENSE MANAGEMENT Source: Own elaboration

Process Groups				
Initiation	Planning	Implementation	Control	Closing
4.3.41 Developing the LM Plan	4.3.44 Review of the Sequence of Activities and adaptation to LM	4.3.48 Coordinate compliance Project Work regarding LM	4.3.53 Project Work Control in relation to LM	4.3.61 Management of Closing and Delivery Licenses (LPO and LFuncionamiento
4.3.42 Identify Stake Holders related to LM	4.3.45 Identifying and Assessing LM Risks	4.3.49 Manage Stake Holders Related to LM	4.3.54 Control of Changes in relation to LM	4.3.62 Gather Lessons Learned from LM
4.3.43 Designate Responsible of LM	4.3.46 Identify responsible LM Suppliers	4.3.50 Risk Management related to LM (Change Management)	4.3.55 Scope Control in relation to GL. (May affect Project specifications)	4.3.63 Team Formation with LM
	4.3.47 Review Planning LM Communications	4.3.51 Supplier Management in relation to LM	4.3.56 Control of Resources work and its involvement in the GL. (Includes TRAINING)	4.3.64 Join Building Book
		4.3.52 Management of communication in aspects related to LM	4.3.57 Control deadlines in relation to LM	
			4.3.58 Control of Costs in relation to LM (Taxes and Fees)	
			4.3.59 Control of Risks related to LM (Change Management)	
			4.3.60 Control of the Communication related to the LM	

5. References

Journals and Articles

Cholbi Cachá, F.A. “*El procedimiento de concesión de las licencias de urbanismo*”. El Consultor de los Ayuntamientos y de los Juzgados. 2002

Cooke-Davies, T. J., Crawford, L. H. and Lechler, T. G. (2009), Project management systems: Moving project management from an operational to a strategic discipline. *Proj Mgmt Jnl*, 40: 110–123. doi:10.1002/pmj.20106

Fernández Torres, J.R., “*Regímenes de intervención administrativa: autorización, comunicación previa y declaración responsable*”. *Revista Catalana d Derecho Público*. (2011- N°42)

García Ruiz-Espiga, A. (2010), “Time Management y el nuevo modelo de gestión público-privada de las licencias de actividad en Madrid”. *Revista “Project Management”*. Grupo Vía .28/2010, AEDIP, Barcelona 2010

García Ruiz-Espiga, A. & Soler Severino, M.J. (2015) “ La duplicidad de organismos tramitadores en la Gestión de Licencias en el ayuntamiento de Madrid” *Revista Aranzadi de Urbanismo y Edificación* n°35; mayo-agosto 2015; Pág. 273 a 293

Harty, C. & Leiringer, L. (2017). “The future of construction management research”. *Construction Management and Economics*, Vol.35, No.7, 392-403

Kedir Mohammed, H. & Knapkova, A. (2016) “ The impact of Total Risk Management on company’s performance”; 19th International Conference Enterprise and Competitive Environment 2016, ECE 2016, 10–11 March 2016, Brno, Czech Republic; 2016. Published by Elsevier Ltd

L. Crosby, B. (1991) “ Stakeholder Analysis: A vital tool for strategic managers” USAID’s Implementing Policy Change Project; March 1991

Narváez Rosero, M.P. “Risk Management in the Design Phase for construction projects using the Pmbok Guide”

Rocha, L.A. & Gama Ponce, T. (2006); “Costos preliminares en proyectos de edificación” 2006

Rasmussen, J. & Svenung, I. “Proactive Risk Management in a Dynamic Society” ISBN 91-7253-084-7

Soler Severino, M.J., Humero Martín, A.E. “*Análisis de la Dirección Integrada de Proyectos de Construcción («Project and Construction Management») en el ámbito jurídico español*”. *Revista Aranzadi de Urbanismo y Edificación (RUE)*. Editorial Aranzadi Thomson Reuters. ISSN: 1576-9380. N° 27. Enero-abril 2013. Pág. 331-355.

Books and chapters

SOLER SEVERINO, M.J., “*Manual para el Director de Proyectos de Construcción- Project and Construction Manager*”. Marea Libros. 2013

AEDIP, “*Libro Blanco de la DIP*”. Ed. AEDIP. Madrid 2007

CASTELAO, J. SANTOS, R. “*Derecho urbanístico: manual para juristas y técnicos*”. Ed. El Consultor de los Ayuntamientos y Juzgados, SA. Madrid 2012

PROJECT MANAGEMENT INSTITUTE (PMI), PMBoK “*Project Management Body of Knowledge*”. Ed. PMI 5th. EEUU 2012

PROJECT MANAGEMENT INSTITUTE (PMI), “Construction Extension to the PMBoK”. Ed. PMI 5th. EEUU

Proceedings and conference papers

Paper presented at a conference

Soler Severino, M.J. Rubio Landart, J. “ The future obligations of Project Manager as Constructor Integral Director in the law of building construction in Spain” XXXVIII IAHS, International, Estambul 16, 17, 18 y 19 de abril de 2012

Soler Severino, M.J., Humero Martín, A.E., Rodríguez Rodríguez, A., “The integral Director of the construction process and its inclusion as independent agent in the management of Spanish building law”. XXXIX IAHS, Milan 17, 18, 19 y 20 de septiembre de 2013