

BDC

Università degli Studi di Napoli Federico II

16

numero 1 anno 2016



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**The Inclusive,
Resilient, Safe
and Sustainable City:
Models, Approaches,
Tools**



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BDC - Bollettino del Centro Calza Bini - Università degli Studi di Napoli Federico II
Registrazione: Cancelleria del Tribunale di Napoli, n. 5144, 06.09.2000
BDC è pubblicato da FedOAPress (Federico II Open Access Press) e realizzato con Open Journal System

Print ISSN 1121-2918, electronic ISSN 2284-4732

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SUSTAINABLE CONSTRUCTION SITE: PLACE OF KNOWLEDGE AND TRANSFORMATION

Antonella Violano, Alessandra Cirafici, Letteria Spuria, Lucia Melchiorre

Abstract

Contemporary city, place of social identity and historical memory, is cyclically affected by the presence of construction sites that hinder the usual physical and perceptive fruition of its public spaces and monuments. The necessity is to use these places of transformation as places of experimentation and spread of knowledge, producing a new image of the city and its monuments in order to allow the transmission of the meaning and value of the transforming physical space toward the future. The research work focuses on these issues and here we present some critical insights. The feasible answers are part of valorization plans, construction solutions and design guidelines, which aim to promote a transformation process, that can really be defined “sustainable” by exploiting communication strategies, which transform a traditional construction site in a “construction site of knowledge”.

Keywords: construction site, environmental impact, social impact

IL CANTIERE SOSTENIBILE: LUOGO DI CONOSCENZA E TRASFORMAZIONE

Sommario

La città contemporanea, luogo di identità sociale e memoria storica, è ciclicamente interessata dalla presenza di cantieri che ostacolano la consueta fruizione fisica e percettiva dei suoi spazi pubblici e dei suoi monumenti. La necessità è quella di utilizzare questi luoghi della trasformazione come luoghi di sperimentazione e di diffusione della conoscenza, producendo una nuova immagine della città e dei suoi monumenti, al fine di consentire la trasmissione verso il futuro del significato e del valore dello spazio fisico di trasformazione. Il lavoro di ricerca si concentra su questi temi e in questa sede si presentano alcune riflessioni critiche. Le risposte possibili sono concepite come parte integrante di piani di valorizzazione, soluzioni costruttive e linee guida progettuali che mirano a promuovere un processo di trasformazione che possa davvero dirsi “sostenibile”, utilizzando quelle strategie di comunicazione che trasformano un cantiere tradizionale in un “cantiere della conoscenza”.

Parole chiave: cantiere, impatto ambientale, impatto sociale

1. Introduction

The aim of this study aims is to provide a different perspective on urban dynamics of the post-industrial city by a thorough study of the principles that guide the transformation of public spaces in order to promote an alternative way of designing and using them as “open space sharing”. The field of study on which we will try to reflect is the construction site is intended as an excellent metaphor for the dynamics of contemporary, characterized by widespread size of “impermanence”. Furthermore, the urban construction site determines perceptively and sensitively new temporary urban landscape. The community, which normally recognizes itself in the living place and interacts daily with it, has to deal with an evolving space. Innovative approaches to governance, planning and management, in which the creativity and resilience are the key components to enable sustainable development of the complex system landscape, are needed. These themes have been investigated in a PRIN project and are the starting point for further development of the research, titled “Communicative Construction Site” (CCS Research), more directly focused on evaluating the communicative and participative potentiality of the cultural heritage's construction site. This focus is related to the observation that the contemporary city is cyclically affected by the presence of construction sites that hinder the usual physical and perceptive fruition. The architectural and archaeological restoration site, which often represents a concentration of temporary impediments of heritage's fruition, can become an opportunity of knowledge, valorizing historic characteristics and improving cultural values, thanks to the support of new communication tools. The aims of quality and environmental sustainability require reduced distances between conflicting old and new in order to get a renewed balance between the demands of conservation and transformation. Therefore, is proposed an innovative management method for the historic construction site, that converts socio-economic costs and environmental impacts in social, cultural and energy-environmental benefits, is proposed. Then, using the places of transformation such as places of experimentation and spread of knowledge, we produce a new contemporary image of the city, territory and monument, in order to allow transmission in the future of the meaning and value of the existing physical space. It is in this direction that moves the CCS Research moves, a more strongly oriented path to the evaluation of socio-environmental implications of urban construction sites of cultural heritage. The design of the construction site is analyzed in three distinct fields, which significantly influences the well-being of the city: strategies for environmental sustainability, strategies for communication, participation and sharing, strategies for the administrative procedures management. In these fields, the architect's role seems to be understood as intermediary (Ratti, 2014), a creator of open reading frames rather than deterministic solutions, a creator of a set of parameters useful for guiding processes and good practices able to overcome the physical - and other - barriers between construction site and city and to work with success on that spatial-temporal ‘threshold’ represented by the construction site.

2. Construction site: the staging of transformation. Design, participation, sharing

In his, *Discourse on the Method*, Descartes, reflecting on the idea of the city, said «[...] buildings planned and carried out by one architect alone are usually more beautiful. [About] those ancient cities which [...] have become in the process of time great towns, [...] it might be said that it was chance rather than the skill of men guided by reason that led to such an arrangement» (Descartes, 1637). The variety, complexity, transitoriness and

apparent fortuitousness of the fabric of the contemporary city seem to confirm Descartes' pitiless judgment. This latter appears, though, dramatically inadequate for a reflection upon an image of the city that today cannot be captured by means of pre-ordained patterns and that proceeds in leaps and lulls, like a disconnected, irregular jigsaw puzzle (Trione, 2014). Postmodernity has inaugurated an aesthetics at times difficult to decipher, made of occasional, apparently random relationships, changeable meanings and temporary images. It almost seems as if reflecting today on the image of the city - far from Lynch's reassuring schemes or Mumford's utopian perspectives - means to reflect about the muddled shape of a script containing deletions, additions, cuts, destructions, recoveries. Within this context, which involves both "representation" and "self-representation", the contemporary city displays its most distinctive feature: it simultaneously belongs to multiple collectivities, involved in a constant state of flux where local affairs and global affairs, near and far, past and present all coexist. Plural cities encourage anyone who is interested to tune into their significance and to adopt new perspectives, considered the most suitable for portraying this ever-changing world. The great protagonist of this muddle is a symbolic place of urban transformation, the construction site: it is intended as a place representing the propulsive force of a city (the incubator of "the new" thought as a space to be used or as infrastructure). The construction site as a place where the city concentrates all its efforts to safeguard itself and its own identity (construction sites for restoration and recovery purposes). The construction site as a place for collective memory (building sites for archaeology, at times unexpected, at times inappropriate, almost always magnificent!). The construction sites popping up in the body of the city like sudden wounds whose dimension cannot be quantified beforehand (neither in space nor – alas – in time) and making the management of cities even more complex and chaotic. The construction sites rarely share with the public their feverish industriousness anticipating the future perspectives but are instead perceived as yet another imposition of a political will apparently detached from the daily needs and urgencies of end-users who are systematically excluded from the process. This was already highlighted by a worried Negroponce (2007) in his *Soft Architecture Machine* and the situation does not seem to have changed since then. Yet, cities are never imposed from above; nor are they exclusively determined from the bottom by obscure forces difficult to identify and control. Rather, they are always to be found on an imperceptible threshold (Trione, 2014). At this regard, the CCS research path we would here like to briefly explain aims at finding meanings and possible strategies for intervening on that 'threshold' in order to build paths of awareness, participation, correct management, within the process of definition of the places of the contemporary city (not only the physical places but also and above all the places allowing to create relations, that today more than ever qualify the essence of the spaces for life. This is why our reflection concentrates on the most visible *vulnus* (wound) of contemporary cities, namely the construction site, transforming it into a laboratory of possible solutions, desirable behaviors and responsible policies. The construction site in a city is above all a "public space", often taken away from the community, but still a public space. As such, it can be interpreted as a space where the community builds systems of relationships, common living and sociality (Fig. 1). Therefore, if today the construction site is a space excluded from physical experience in most cases, it is desirable to find solutions allowing for this space to be perceived as a space of "possible experience". It should be requested to intervene in its decisional process, it should be possible to physically interact in its execution phases and it

should be possible to launch an investigation process related to its history and the history of the places it is intertwined with and with which it often dramatically interferes.

Fig. 1 - Le chantier des Halles “La Canopée”. Communication strategies



Source: Authors (2016)

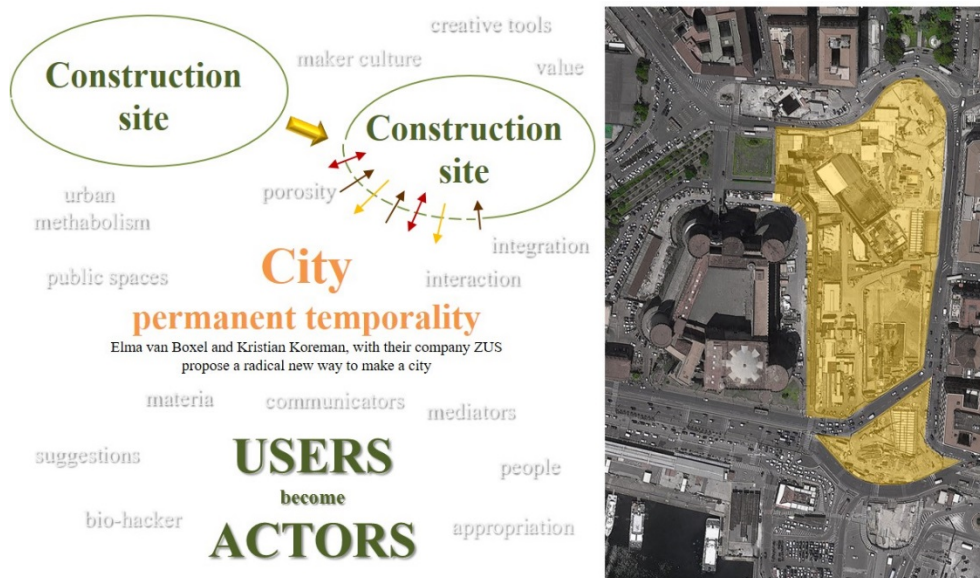
It has to be reminded that, in a recent perspective, the concept of public space appears affected by interesting shifts in meaning. “Common, collective, shared, associative, participated” are adjectives that properly express the plural and multilayered dimension of contemporary public space. They express a condition inducing a reflection about the role that spaces outside the private sphere play as regards the wellbeing of citizens, spaces that are shaped by the practices, the habits as well as the conflicts of daily situations. In this sense, the collective experience of the construction site can be seen an interesting case-study for verifying the effectiveness of the new initiatives occupying public space and of the creative spurs that are meant to provide flexible solutions, practices of repossession and temporary transformation of “voids” waiting for an identity. Today this need is deeply felt and construction sites represent an emblematic case. The construction site reconfigures spaces via a complex projects occupying a space and a time that can be interpreted as a ‘transitional void’. To encourage new forms of management of this unusual public space and to reintroduce it into a value system is key for construction sites to be supported by the community. To use the construction site as a “catalyst” to trigger “relations of urban movement” within the city is an occasion not to be missed. To use the temporary dimension of the construction site as a spur to cultivate imaginaries, to step forward, to reinvest places, is a winning strategy to initiate practices of aesthetical resistance and open source strategies for building a common idea of the city.

3. Vision, performance, environmental impact of the contemporary construction site

The Technological Culture, above all concerning the aspects properly linked with the living sphere, gives a range of instruments, principles and rules to run the modern man’s habitat from the design point of view, without missing the importance of the design “here” and “now”, rather than “anywhere” and “at any time”. The contemporary approach to the eco-oriented design, also in the phase of the construction site, strongly links the concept of wellness to the principle of the “environmentally friendly attitude”, as a good assumption, on which you must explicit the environmental implications of each constructive choice and reconnect the socio-cultural background, not only the planning choices, but also the implementation manners of the design should be based on, to the eco-compatibility sphere. The construction site is traditionally conceived as transitory and temporary element (Koreman and Van Boxel, 2015), as an evident cause for the social and perceptive urban degradation. However, it can be re-interpreted as an opportunity to test action strategies useful to mend the sense of *cittadinarietà* (Violano *et al.*, 2015) in the management of public space. The meaning of public space, in terms of “occasion-sharing” but also of “opportunity to increase knowledge”, has to be used with the aim of a joint growth in the sense of citizenship, through which virtuous creative pushes can be triggered. This is a minefield because the engine of urban transformation is the economic growth; instead, Culture and Knowledge are not “productive science”. The Aristotelian view of a culture, which must to be protected and supported against attacks of utilitarianism and logic of profit, seems very timely. It is necessary to operate at different levels and for different types of users (workers, tourists, occasional users), at the same time ensuring the continuity of the works and the direct or indirect fruition of the heritage, in order to achieve these objectives. In fact, the idea of fruition of cultural heritage, away from the idea of mere observation and contemplation, is combined according to two different paradigms: the technological one, of consistency between structural system and expression, including media and use of the

media, including use's issues and its expressions, and the social paradigm, of relationship between a new world view and its expression on the disciplinary ground of architecture (Gregotti, 1992). The construction site necessarily hinders the direct use of the monument or the public space, but its frontier traditionally protective element that delimits and hides matter and work, can and should become the technological system by which the passage of intangible flows of knowledge are guaranteed. In fact, knowledge and information are the most important factor of development, the only vital factor that is not consumed but it is increased, regenerated, grown and reused in an increasingly productive way (Fig. 2).

Fig. 2 – The construction site becomes permeable to the flow



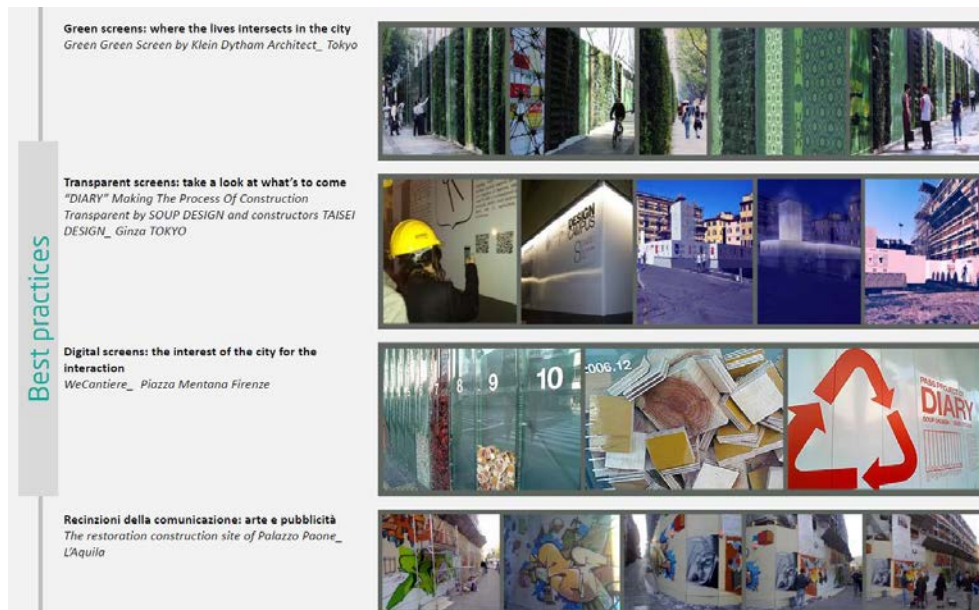
Source: Authors (2016)

All these parameters are as inputs to the cultural growth of the human capital that produces work. However, Knowledge is a phenomenon to be explained: knowing is an effective action, it is to decide, it is operative reality in the domain of existence of the living (Maturana and Varela, 1987), but knowledge is also behavioral coordination, essential interactions existing between living things, from which are deducted social phenomena, linguistic domains, as well as the language and self-knowledge. Assuming that the construction site has physical limitations, which are constraints of the direct fruition of the heritage, the question that is the backdrop to research is: in which way is it possible to make these devices elements of the urban landscape capable of giving an additional value? Several international cases studies have shown that creativity that can designing the fence of a construction site can give significant benefits to the urban system where this is

“although temporarily” inserted. In some cases, the fence changes its natural function of perceptive filter and becomes transparent, i.e. permeable to the visual flow. This allows making visible to the pedestrians the entire construction process that occurs in the construction site, giving rise to a sort of window on the manufacture. Interesting examples are “The Diary” project, realized in Tokyo, and “Grace Site Fence”, made in the USA. This fence is around the Grace Building Plaza that houses the International Center of Photography. We need to think of a way to let people know that the ICP was still alive, despite the construction going on within the site fence walls. Thus, we came up with our idea of a mini exhibition, which displayed the art of ICP students, together with a graphic arrow theme. We believe that the fun of the exhibition site fence came from the surprise of discovery. If we directed people to “look here”, it became just another command in our too-commanded existence: “Open!” “Subscribe Now!” “Call Today!” “Click Here!” “Register now!” “Follow our Tweets!” “Contact Us!” We didn’t want New Yorkers to follow our orders. We wanted them to follow their instincts, their natural curiosity. What we have observed is that once one person peered into a hole in the fence, others followed suit. Our little exhibition made for compelling stopping and looking, and brought more smiles to more face than if we started directing people with commands (Graphic Ambient, 2015). Another way to transform the role of the fence from barrier to tool of inclusion is to integrate multisensory and multimedia systems. The first example in Italy is “WeCantiere” made in Florence: a scheduled event to get residents, visitors and tourists fully involved in the work, thanks to the adoption of advanced technological systems. The use of eco-oriented materials are valorized from LED lights with proximity sensors, free Wi-Fi and open access web portal that explains the history of the ancient arts and the progress of the work. Similar cases of interactive fence are the “iFly Virgin Wonderwall” made in Tokyo in 2000, or the “Song Board” of London. But the fence of a construction site can also be interpreted as an element of artistic integration, such as screen prints of the Walking Men 99, whose installations have been realized in many cities around the world (New York, 2010, Perm, 2011, Sydney-2014, Buenos Aires-2015). Another ingenious example of redesigning the construction site fence using green and bioclimatic systems of rainwater collection is the work of designer K. Jung and H. Kelly Choi. The “Symbiotic Green Wall” is an ecological wall that serves to monitor the environmental impact of a construction site. The wall collects, purifies and redistributes water around the site using natural processes. A digital monitoring system sheds light on water usage and overall health. It even cleans itself with purified water. Conscious of moving into a world full of innovative ideas, projects and project proposals for construction site fences have been selected. The CCS research has led to a critical interpretation of the “positive effects” of using these special screenings of new generation, capable of triggering processes of active participation, integration and communication in the urban environment. The study of these Best Practices is the basis for the specification of certain models of reference to relate to highlight the minimum requirements and the performance expected from each type of shielding, and identify different levels of workable strategies (Fig. 3). The analysis of these case studies clearly show that the construction site is not only a place of production of the construction process. Its project can be managed as an “anticipation” of the future vision of the city, characterized by a predetermined performance requirement, corresponding to an impact that can be managed and minimized in advance. Therefore, the construction site can mediate conflicts and try to find the best alternative, which valorizes identities, which interprets real

needs, which fits to the environmental conditions and allows reversible choices.

Fig. 3 – Best practices of fence for construction site (in collaboration with L. Melchiorre)



Source: Authors (2016)

In fact, the construction site, as a technologically complex system of actions and relationships, is at the same time the verification of the design phase and the premise of the management phase. In this particularly sensitive place, a multitude of people, with different roles and tasks, operate independently, but also act together for the realization of the architectural works in perfect synergy. Here, the very notion of design assumes the role and significance of forecasting tool, in which the time component has to be considered as a dynamic variable. During the research work, the attention has been focused on two important aspects: the socio-cultural impacts, interpreted primarily as opportunities for a creative and resilient growth of the Social Capital for the urban system (Research Project: Communicative Construction Site - CCS), and environmental impacts (Research Project PRIN) on soil, air and water receptors, to be sustainably mitigated and managed. The construction phase is characterized, in fact, by a series of processes, which follow one another temporally, whose environmental impacts are limited to the execution time of the works. Generally, the environmental impacts are classified as temporary and permanent. However, in a construction site, the distinction between “direct impacts”, i.e. those linked to all activities, products and / or services, on which the construction company exercises direct control (emissions into water, into atmosphere and soil, use of resources, contamination, etc.) and “indirect impacts”, on which the organization can exercise only

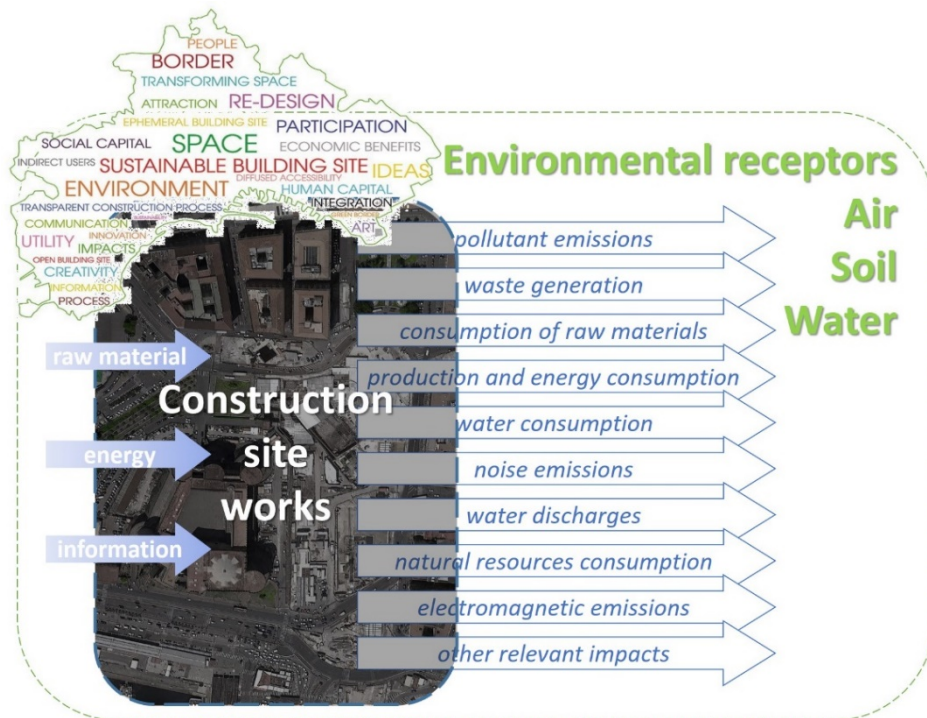
partial control, is relevant. In fact, mitigation measures can be adequately provided above in relation to the direct impacts. According to ISO 14000, the environmental aspects of a construction company determine the environmental impacts; in practice, there is among them a relation of cause and effect. The environmental impacts are classified as: circumscribed impact (the effects are only revealable on the construction site), limited impact (the effects are observable in the surrounding environment (within a radius of 500 meters from the site) to the neighborhood level) and widespread impacts (the effects are recorded on a significant part of the whole system on an urban scale). Considering the construction site as a complex system in which the processes are in conflict or in direct synergy with the urban continuum, in order to increase the synergies (social, cultural and economic benefits) and reduce conflicts (negative impacts), closure and openness to public space must be managed with appropriate technology. The Urban Impact Analysis shows the effects produced on the social-economic context, separating the social context from the economic one, after setting up the receptors profiles. From a social point of view, it is very important to take into consideration: people distribution, quantitative articulation of residents and workers in the surroundings (strictly depending on the kind of urban settlement) and man-type receptor, social-demographic characteristics and his average health conditions (for the arrangement of the mitigation measures a preventive analysis on the presence in the building site surroundings of hospitals, rest-home, nursing-home, should be carried out). The impacts capacity of determining environmental changes and interfering with physical welfare or, generally, with the quality of life, are strictly connected with the importance and typology of the building site (Fig. 4). From an economic point of view, impacts are considered sensible to the changes brought to environment: urban settlement typology (residential, tertiary, industrial, etc.), the fruition of the services from population and business enterprises, the productive activities development modes and the value of soils and buildings (Franchino *et al.*, 2004). Therefore, it is extremely important managing the impacts and ensuring that environmental, social and perceptual noise factors are transformed into opportunities for information and participation of the people to the same transformation. The main beneficiary is the citizen (the direct and / or indirect and / or potential user) who, only for the living in a city that is full of transformations, is sensitized to environmental and cultural issues and, therefore, improved as a citizen (Organisation for Economic Co-operation and Development, 2001). The Receptors on which an over ground construction site produce significant environmental effects on, although in varying degrees, can be summarized into two categories:

- Anthropic system: workers (workers and technicians of the construction site), workers (at work near the construction site), residents in the surrounding areas, etc.;
- Urban system: pedestrian mobility, vehicle mobility, services providers, etc..

The benefits of sustainable management of the construction site are numerous. On a construction site, that demonstrates environmentally conscious management of environmental and social impacts, relationships with citizens, local institutions and customers are favored, because accidents are potentially reduced. Permits and authorizations are obtained more easily because there is greater assurance of control of the relevant risk. Moreover, from economic point of view, the costs of raw materials and energy, as well as fees payable disposal and emissions are reduced. This means companies have more market opportunities as well as significant benefits in access to funding. The environmental policy of a construction company is the result of an integrated vision, in

which the “environmental aspect” is combined, in a right balance, with other aspects of enterprise policy (Quality, Health and Safety, etc.).

Fig. 4 – Environmental impacts/receptors



Source: Authors (2016)

Significant quantitative indicators help the company to monitor resources, time and achievements. The grid of indicators for the assessment of impacts on the urban system of the different phases of implementation and the identification of the receptors in relation to the types of impact are one of the partial results of the research. The objective is to build an efficient tool in order to evaluate, starting from types of work on built heritage, subsystems technical, operational phases and means of work, which has the lowest impact on operating procedure among the available ones. During the research work of the PRIN project (funded by the Ministry of University, entitled “Landscape Protection between Preservation and Change. Economy and Beauty for a Sustainable Development”. National Coordinator: C. Truppi; SUN Coordinator: F. Muzzillo), relevant aspects and impacts have been investigated for each category: water, energy, waste, social, etc... In particular, the process approach helps in determining the degree of risk of the activities that take place within the site during normal, occasional or anomalous operations and in potential emergencies, such as contamination or accidental pollution. Generally, in this stage of the analysis, a

decomposition of the process in elementary phases is suitable, identifying for each one the Matter and Energy Budget. The purpose is to identify exhaustively detailed and potential trouble spots for proper environmental management, without losing sight of the whole system. Finally, the most significant phase relates to the identification of environmental aspects of each stage of the process. In particular, the data collection covers pollutant emissions, waste generation, consumption of raw materials, production and energy consumption, water consumption, noise emissions, water discharges, natural resources consumption, electromagnetic emissions, etc. (Fig. 5).

Fig. 5 – Impact's typologies of an urban construction site

		AREAS/WORKS OF CONSTRUCTION SITE																
IMPACT CATEGORIES	RELEVANT ASPECTS	Soil temporary occupation	Evacuation and demolition	cutting of vegetation	Earthworks	sounding	Land treatment	area fence	service tracks and transit of vehicles and machinery	Buildings and temporary facilities for the workers	Cargo handling/materials	Scaffolding and temporary works	Service plants	Construction site Machinery	Processing areas	Storage areas of inert and building materials	Storage areas for waste materials	Dismantlement of the c.s.
A.1	WATER FOR PRODUCTIVE USE													X				
A.1.1	processing													X				
A.1.2	working													X				
A.1.3	washing	X	X	X	X	X	X								X			X
A.2	CIVIL WASTEWATER								X				X					
A.3	CONTAMINATEDRAINWATER	X	X	X	X		X				X				X	X	X	X
B1	NO-RENEWABLE PRIMARY ENERGY (factor to minimize)																	
B1.1	Illumination							X	X	X		X		X	X	X		
B1.2	Heating									X								
B1.3	Cooling									X								
B1.4	Hot water production									X								
B1.5	specific machines		X	X	X						X			X				
B2	RENEWABLE PRIMARY ENERGY (factor to maximize)																	
B2.1	Illumination							X	X	X		X		X	X	X		
B2.2	Heating									X								
B2.3	Cooling									X								
B2.4	Hot water production									X								
B2.5	specific machines		X	X	X						X			X				
C1	WASTE PRODUCTION		X	X	X	X				X		X						X
C2	WASTE STORAGE		X	X											X		X	
C3	WASTE TRANSPORT TO DISPOSAL		X	X											X		X	
C4	RIUSE/RECYCLE		X	X											X		X	
D1	GREEN			X				X										
D1.1	pre-existent																	
D1.2	transitory	X					X	X										
D1.3	design						X											X

Source: Authors (2016)

Once identified the aspects related to the performed work, the environmental impact can be determined, adequate mitigation measures can be identified and possibly implemented, even during construction.

4. Construction site: strategy for a management

A public construction site designed to transform/regenerate urban and suburban areas represents a key point in the building process, the place of the “already but not yet”, a workshop producing spaces where the thought becomes material and human industriousness can counteract the signs of the passing years. The opening of a construction site temporarily takes spaces from the community and completes a long-lasting preparatory stage during which the needs and demands of citizens are identified; the actions aimed at meeting the citizens’ needs are pinpointed; the necessary funds are solicited and gathered; the actual projects are evaluated so that the best cost-benefit ratio for the construction of the facility or infrastructure, its maintenance, management and displacement is provided; the projects are approved by the individuals that are involved on different grounds in environmental management and protection; the project is assessed and approved in order to be made eligible to win a bid and then the most suitable agent/economic operator, whose duty is to put the idea behind the projects into effect and to meet all of the needs and demands, is chosen.

The closing of a construction site brings a new asset back to the community and starts a long-term management process entailing routine maintenance and emergency maintenance, renovation works that might be associated with a change in use classification, and finally displacement activities. The construction site itself represents a free zone – either punctual or linear, areal, permanent, itinerant – that is temporarily taken away from the community. Flows of people, vehicles and materials that are involved on different grounds either in the actual making or in the evaluation and validation of the project literally pass through a construction site. This free zone needs to regulate and keep track of the complex flows entering its area in order to guarantee, first, the safety of all the workers involved, and also the completion of a high standard project within the assessed budget and the scheduled time. Moreover, it needs to establish and regulate a relationship with the external areas in order to turn the temporary inconvenience caused by the construction into an opportunity for the place where the building site is located. However, despite the vital importance, the fundamental function and the strong visual impact due to the very structure and dimension that a construction site has in the area where it is placed, as a matter of fact the professionals in the field have so far created plans of construction sites that far from considering building sites as new organisms developing within the urban space, are limited to dealing with merely ergo-technical issues or to ensuring work and health safety and seem to fail to acknowledge and define the physical, perceptual and functional connection between a construction site and the surrounding area. In light of these considerations, the research conducted on the administrative procedures related to construction sites builds on the analysis of the legislation that regulates public works and aims to retrieve information, guidelines and cues that might help develop an enhanced planning approach to the management of construction sites. After an initial analysis of the sources, it turned out that the object of our investigation, namely the relationship between construction sites and the surrounding environment, is barely mentioned in the Public Procurement Code (Decreto Legislativo DL n. 163/2006) and in the Implementing Regulation (Decreto del Presidente della Repubblica DPR n. 207/2010) too. In more detail, article 15, paragraph 9, of the above-mentioned Regulation (general legislation) states those projects have to include some measures that are to be taken in order to prevent the negative effects of construction

activities on the environment, landscape and cultural heritage. Such measures must encompass, among other things, an analysis of the means of access to the construction sites aimed at limiting any potential interference and an identification of the precautionary actions that can be taken to avoid soil pollution, noise pollution, water pollution and air pollution. One more reference is to be found in article 17 of Regulation, according to which preliminary projects must include a document entitled "First directions and measures regarding work and health safety in view of the drafting of the safety plans". Other explicit references can only be read in some papers related to the analysis of eco-sustainability. Yet, here the issue is still dealt with by focusing on the problem of safety – environmental safety, to be more precise. Hence, the critical investigation presented here aimed at identifying practices in the building process that might trigger some in-depth exploration of new strategies for the management of the external relationships, and above all the people that can be in charge of this management. Firstly, Communication plans for the construction site could be drawn up and included in the paper that illustrates the provisional development plans. As far as accounting treatment is concerned, the communication plans could be part of the economic planning formulated by the administration and they could be covered by the available funds. Also, the selection of the economic operator - based on the most favorable financial offers - could include among its assessment criteria the potential offer of innovative solutions to improve the communication with the construction site, its fruition and even the possibility to visit it.

5. The Communication Plan: a management tool for sensitive transformations

The difficulty of planning cultural interventions in a systemic, integrated and sustainable key can be made easier through an accompanying action, which uses methods, tools, skills and professional experience able to enhance the design and management quality in all transformation phases of the cultural heritage. Any public or private subject, who starts a transformation of the cultural heritage, should involve the surrounding context in an open process of communication and sharing.

When the cultural heritage, whether it is an architectural "good" or an archaeological area, is interested by interventions of transformation, it is essential to study and test if and how you can reduce the negative effects of these transformations. Really, the goal is not to mitigate the negative effects of transformations, a result that falls outside the competence of the communication, rather to accompany the implementation process of an intervention (restoration, recovery or archaeological excavation), supporting it with appropriate activities that give the users involved, tools to understand and opportunities to participate. In fact, a correct communication allows a comprehensive understanding to accompany the change during the transformation processes. The construction site does not have been considered as a closed and separated item whose existence is merely technique. It can be a cultural and communication instrument, and an opportunity for growth. According to this approach, the user becomes aware of the transformation of the built area where he lives every day and, in this way, the city, as a center of resources, through its transformation, earns a precious value of actual and perceived sustainability in the long period. To adapt the culture of communication to the specific nature of the cultural heritage construction sites, it is appropriate to start from the identification of the features, which make effective communication. The Communication Plan is the new generation tool proposed.

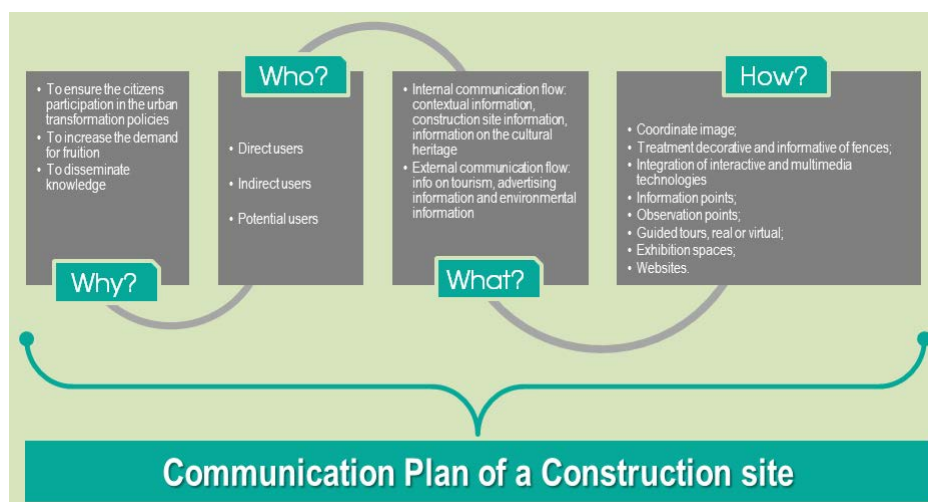
The Communication Plan and the Visual Coordination Handbook of Olympic Turin, the

Communication and Fruition Plan for the Great Pompeii Project, or the Communication Plan for the “Construction site event” for the realization of underground parking on the historic Celestini Square in Lyon are just some examples of what now is becoming a usual practice for the “great” transformations. Just like any other planning tool, a communication plan, should satisfy four basic questions:

1. Why communicate? (Setting goals);
2. Who communicate? (Identification of the user types involved);
3. What to communicate? (Selecting the information to be sent);
4. How to communicate? (Adoption of strategies and communications tools).

The primary objective of the construction site communication process is to ensure the citizens’ participation in the urban transformation policies, since participation and shared decisions enhances the acceptability of the social costs of the interventions. In addition, a Communication Plan increases the demand for fruition. A communication plan should first identify the different users involved, senders and recipients (Fig. 6).

Fig. 6 – The basic structure of an efficient Communication Plan for construction sites



Source: Authors (2016)

To identify the different types of direct, indirect and potential users, it is necessary planning messages, actions and channels to be activated, coordinating them with the timing of the works. The required skills are different: from those of standard communication (copy, graphics, drawing, animation, multimedia, audiovisual and media relations personnel), to the technical/ specialist, keeping constantly updated communication flow, synchronously with the construction site evolution and responsive to sensory and emotional reactions of users. About what to communicate, the choice is extremely wide, and it may vary from case to case. In particular, the types of information to be transmitted can be so distinguished:

- Internal communication flow: contextual information, construction site information, information on the cultural heritage object of intervention;
- External communication flow: info on tourism, advertising information and environmental information.

In addition, the construction site can be an opportunity to disseminate knowledge for younger users, through the planning of events, workshops design / construction / animation, but it can also be a training tool, to start some young people to work through “educational sites”. The Communication Plan establishes, in fact, the instruments to be adopted to implement the communication process, a *Vademecum* in order to ensure a better effectiveness of information and publicity. Finally, the results of the implementation of a Communication Plan for the construction site of the cultural heritage should be monitored in order to ensure its effectiveness. In fact, fruition surveys must be based on the fallout that the construction site has in the life of the city or area in which they occur.

The development and the following implementation of these plans has certainly the main goal to reduce the inconvenience caused to users involved, but also to attract other potential users, in order to increase the visibility and the use of cultural heritage during the whole transformation phase.

Attributions

Paragraphs are attributed to: 1. Violano A., Cirafici A.; 2. Cirafici A.; 3. Violano A.; 4. Spuria L.; 5. Melchiorre L.

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