

Developing Coordination System for Environmental Safety around Urban Construction (ESUC) Sites

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Abstract

During the execution of urban construction projects, a large number of injuries and loss of lives are experienced especially in large metropolises like Istanbul. This is due to the lack of coordination between the service providing institutions (e.g. electricity, water, gas, phone, traffic etc.) and not having been given enough consideration to occupational safety issues. In addition to loss of lives, there also occur a vast amount of material, effort, money and time losses. In this study, development of a Coordination System (for Environmental Safety around Urban Construction (ESUC) Sites) for Istanbul is aimed in order to ensure multifaceted coordination between all relevant institutions and organizations and to protect tranquility of society, natural environment, historical texture, property, life, traffic order etc. during the urban construction activities. Aforementioned system is planned to provide an overall coordination base for Istanbul Metropolitan Municipality (IBB), subsidiaries of IBB, affiliates of IBB, district municipalities, other relevant public and private institutions. It was also intended to provide effective solutions to most of the problems in urban construction sites. Instead of generating a new supreme board for the implementation of the ESUC system an organization under the roof of the Infrastructure Coordination Center (ICC) in which all stakeholders of ESUC are already represented, is recommended.

Keywords: *urban construction sites, environmental safety, Istanbul Metropolitan Municipality, organization system, coordination.*

1 Introduction

There have been numerous research regarding health and safety issues within construction sites (Zhang and Li, 2015; Fung et al, 2014; Ale et al, 2008; Chua and Goh, 2005; Dingsdag et al, 2008; Perttula et al, 2003; Rubio et al, 2005; Toole and Gambatese, 2002; Trajkovski and Loosemore, 2006, Waehrer at al, 2007; Fung at al, 2005; Gambatese at al, 2005; Gorp, 2007; Mohamed, 2002; Siu at al, 2004). Nevertheless there is a lack of research

concerning health and safety issues of the society who remain out of the construction site. Construction works in an ESUC –unless sufficient precautions are taken– may cause loss of lives, injuries and money losses and it may also disturb community's comfort due to negative effects like excessive lighting, vibrations, noise, dust, environmental and visual pollution etc. In this study it was aimed to develop of a new organizational system that would minimize various damages caused by the construction activities within Urban Construction Sites (UCS). Health and Safety issues within the construction sites were not included in the scope of this research. Focus was on the vicinities of UCS in order to minimize adverse effects of construction activities on neighborhoods within Istanbul Metropolitan Area. These adverse affects maybe related to human beings, goods and buildings, environment, historical texture and peace in surrounding areas.

2 Research Methodology

Methodology of the research may be summarized as follows:

- Meetings with the staff of Strategy Development Department of Istanbul Metropolitan Municipality (IMM): Research scope was defined in the first meeting. Construction Site types were identified in the second and third meetings. The fourth meeting was arranged as a workshop.

- Collaboration with the Employers' Association of the Turkish Construction Industry (INTES): Two companies participated in the research. These companies contributed to workshops and provided relevant documents.

- Domestic Literature Review: Domestic literature has been searched and evaluated. Useful documents were obtained from the Turkish Ministry of Labour and Social Security.

- International Literature Review: International literature has been surveyed. Environmental Safety around Urban Construction (ESUC) activities in Metropolises namely Roma, Milano, Paris, Liverpool, London, Chester, Manchester, Berlin, Tokyo, New York, Washington DC, Seattle, Sydney, Moscow were surveyed in Internet. The municipal administrators of these metropolises were contacted via inquiry e-mails. In the meantime, Urban Construction Sites (UCS) in New York, Washington DC, Seattle, Vancouver were visited. Relevant managers of these municipalities were interviewed on their ESUC related experience.

- Workshops (W1 – W9): Workshops were conducted with the participation of the interested managers of the ESUC stakeholders. First four workshops were focused on environmental safety and coordination works needed to be carried out in three phases: mobilization, operation and closing out of construction sites. In last five workshops project development and construction processes were analyzed.

- Legislation Investigation: Related domestic legislation has been reviewed and evaluated with respect to the research topic. This investigation has been carried out focusing on neighborhood and environmental safety as well as protection of peace within the communities surrounding UCS.

3 Development of the ESUC System

The target of this research was development of a comprehensive new system that would provide permanent solutions for all types of ESUC problems concerning all ESUC stakeholders (Istanbul Metropolitan Municipality (IMM), associations related with IMM, companies in which IMM is a stakeholder, district municipalities and other relevant public and private organizations). The advantages and disadvantages of the ESUC Group in case of being a part of different organizations were evaluated and the results were analyzed as shown in Table 1.

Table 1. Advantages and disadvantages of the proposed ESUC group in case of being dependent on different organizations

In case of being a part of Ministry of Labour and Social Security	
Advantages	**Disadvantages**
Since it is more authorized, a group which depends on Ministry of Labour and Social Security may be more effective than a group depending on Municipality.	Communication of the public (complaint etc.) may be more difficult than a group depending on Municipality.
In case of being a part of the office of the Secretary General of IMM	
Advantages	**Disadvantages**
Communication of the public (complaint etc.) may be more easy than a group depending on Ministry of Labour and Social Security.	Since it has same authority with other departments, power of sanction may be less.
In case of being a part of Building Inspection Services	
Advantages	**Disadvantages**
More construction site can be more controllable due to numerous building inspection companies. It will reduce the additional cost and need for human resource which can be occurred due to the unit added to Municipality.	Building inspection companies may not fulfill the duty objectively (contractor should not intervene in inspection company).
ESUC group that consist of a great number of private ESUC inspection companies	
Advantages	**Disadvantages**
More construction site can be more controllable due to numerous ESUC inspection companies. It will reduce the additional cost and need for human resource which can be occurred due to the unit added to Municipality.	ESUC inspection companies may not fulfill the duty objectively (contractor should not intervene in inspection company).
In case of being a part of ICC (the Infrastructure Coordination Center of IMM)	
Advantages	**Disadvantages**
New supreme board will not be required. Additional employment requirement will be minimum. Efficiency for the current control and coordination channels will increase.	Nothing.

Instead of establishing a new supreme board for ESUC System, establishment of an organization under the umbrella of ICC -where all ESUC stakeholders are already being represented– was proposed. The proposed organizational structure is presented in Figure 1. It was decided that this organization could create effective system in which all ESUC stakeholders play an active role. Thus regular and permanent inspection and guidance of all stakeholders' ESUC will be possible. Consequently it is anticipated that problems encountered in ESUC could be minimized.

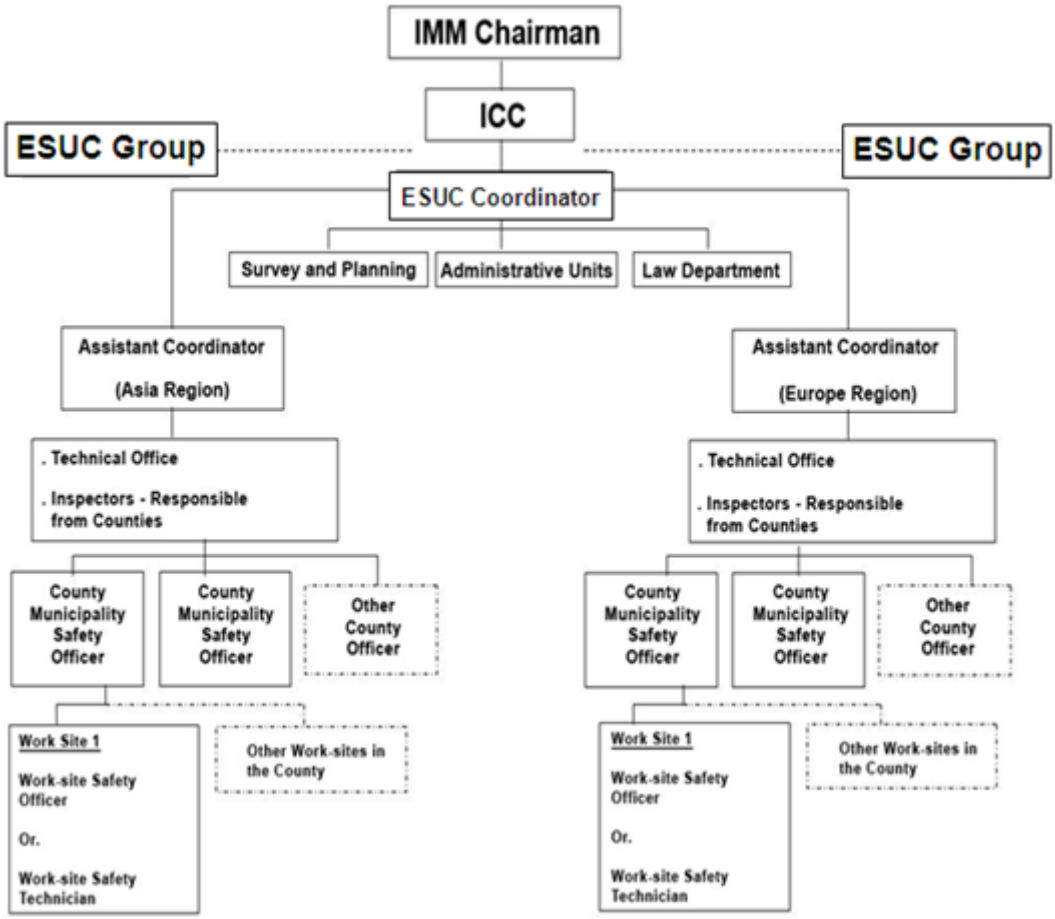


Figure 1. Organization scheme for coordination and control system

The ESUC system would have a main coordination center managed by the ESUC Coordinator who would be a member of the ICC. Besides, there would be regional offices on Asian and European sides of Istanbul which would be managed by Assistant Coordinators. It is recommended that regional technical office inspectors, inspectors responsible from counties, county municipality safety officer, work-site safety officer and work-site safety technician should be the natural participants of the ESUC system.

4 Conclusion and Recommendation

As a result of 9 workshops conducted with experts and domestic and international literature reviews with the scope of this research, it is proposed that developed ESUC system -in terms of organization- should be under the umbrella of an authority such as ICC which is composed of all ESUC stakeholders. Thus it has been concluded that ESUC system could be a permanent, comprehensive, living, reputable, authorized and effective system which could prevent great number of tangible and intangible damages to the environment due to urban construction activities. This assessment is equally true for both private and public construction activities. For this purpose, ESUC group should use the latest methods and technologies. Continuing training, updated information sharing, effective coordination between ESUC stakeholders should be ensured. Recommendations based on the research summarized above are presented below. They should also be taken into consideration for the establishment of ESUC Coordination and Control Group.

- ESUC Group should work within the framework created by the standards include OHSAS 18001 and ISO 14001.

- ESUC stakeholders (IMM and other public and private institutions/organizations) should pay attention to work with the contractors who implement TS CEN/TR 13833 "Qualification of construction enterprises" standards.

- ESUC stakeholders (IMM and other public and private institutions/organizations) should develop common digital map on which they can share scope, location and schedule of their ESUC projects.

- Check lists should be prepared for protecting tranquility of society, natural environment, historical texture, property, life and traffic order.

- All ESUC stakeholders should keep up with current regulations and standards about ESUCs. Site applications should be inspected carefully and negligence should not be allowed.

- ESUC inspectors should also be inspected regularly by experienced officers of IMM (punishment-reward).

- Contractors' previous performances about ESUC projects should be followed and recorded.

- For ESUC projects, standards and obligations to protect the tranquility of society, natural environment, historical texture, property, life should be an inseparable part of bid documents (environmental safety plan).

- Required cost related to environmental safety precautions of ESUC also should be taken into account while adjusting the bidding price.

- Some amount of material consisted with standards stated in specifications should be purchased and stocked by IMM in order to support the firms who have difficulty in procurement of material for safety precautions.

- ESUC group members and related employees and managers of ESUC stakeholders' should develop and implement regular education programs for the public.

- Educating and raising awareness of children should be given special importance. In this respect, all kinds of written and visual media opportunities should be used.

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