

A STUDY ON COMPLIANCE WITH OCCUPATIONAL HEALTH AND SAFETY RULES IN YACHT INTERIOR PRODUCTION

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Key words	Abstract
<i>Occupational health- safety, Yacht interior, Yacht building, Yacht furniture.</i>	Occupational accidents are one of the most important problem of Turkey's Manufacturing Industry from building construction to shipbuilding despite the fact that there is a legislation being in force called the law no 6331. According to this legislation yacht building appears in the very dangerous danger class while furniture production appears dangerous expect surface finishing processes like varnishing, lacquering and etc. But both activities indissociable due to installation of furniture inside a yacht and there would be accidents cause fatality while manufacturing activities neither very dangerous nor dangerous. Because of these reasons this study tried to put forward the situation of yacht interior in Turkey with face to face conversation survey. 57 firms which manufacture yacht interior in Marmara region of Turkey have been surveyed in terms of obeying the occupational health and safety rules. According to the study results, discussion was made with limited literature and suggestions were offered by the help of discussion.

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1. INTRODUCTION

According to Akın (2012) Occupational Health and Safety (OHS) is an interdisciplinary field that requires the contribution of all social partners such as states and according to Yirmibeşoğlu (2009) most important task of the state is securing the body and life of the individuals by providing the necessary conditions. Turkish State put into force a law called “law no 6331¹” to achieve this goal. Law no 6331 aims to prevent work accidents and occupational diseases and thereby compensation for the damage arising out of these accidents and diseases (Akın, 2012). But, in Turkey, OHS becomes the main topic of conversation as a result of work accidents and after quickly falls off the agenda until a new accident. Kılıkış and Demir (2012) stated that 98% of accident arises out of unsafe workplace and behavior in Turkey and Turkey was located on the top in Europe in terms of accidents.

According to Özcan (2008) shipbuilding was one of the fastest growing industries in Turkey but not in direct proportion to compliance with OHS. And according to Kavi and Koçak (2011) “*The sector requires obligations and necessary activities in terms of vocational health and security*”. Subcontracting may be a question of fact in this industry in terms of OHS. In shipbuilding industry, subcontracting is divided into two; domestic (settlement inside the

¹ 20th May 2012 and law no 6331 (The Official Gazette 30.06.2012 / 28339).

same facility) and external sub-contractors (Altundaş and Topuzoğlu, 2011; Akdemir, 2008). Interior production and installation works are done by subcontractors or boatbuilders.

According to Murphy et al. (2004) there are lots of extremely hazardous circumstances and job tasks often associated with boatbuilding industry. Exposure to toxic substances, ergonomic injuries, hazardous atmospheres, electrocution, falls, fires, explosions, lacerations, low back trauma, repetitive motion, excessive noise, burns, vapors, among others, are some of the hazards that employees may encounter in boatbuilding or repair works (Murphy et al, 2004; Anon, 2010; Brigham and Landrigan, 1985). And, woodworking is one of the extremely dangerous circumstances and job task in boatbuilding industry. Because of this, workers in boatbuilding industry need to be careful of some hazardous substances while breathing or contacting with them at work.

From this point of view, this study aims to investigate the situation of compliance with OHS rules in yacht interior production in Turkey. For this purpose, 57 firms were surveyed, discussions were made and suggestions were offered.

1. MATERIALS AND METHOD

This study has been performed with the firms, manufacture yacht interiors in Marmara region of Turkey, by a direct conversation. At first, yacht builders have been identified by registry lists of related organizations such as Chamber of Shipping (DTO), Turkish Ship and Yacht Exporters Association, Undersecretariat of Maritime Affairs. And, according to the Undersecretariat of Maritime Affairs, there were 117 firms which builds boat or yacht in Marmara region. But, some of these firms were not manufacture interiors and therefore total of 61 firms have been identified for the target population of this study after the cross check of all the registry lists. Then, firms have been classified into 3 groups; shipyards, interior design firms, interior manufacturing firms. 3 of 61 firms refused our request and other one was in liquidation. Later on, interviews, with 57 firms, have been conducted with firm owners, managers or staffs who have the ability to represent the firm.

Sample space determination has been calculated with following equality (Yamane, 2001);

$$n = Z^2 * N * P * Q / (N * D^2 + Z^2 * P * Q) \quad (1)$$

Z → Standard errors (1.96 for 5% Confidence Interval)

N → Statistical population size

P → Probability of desired feature existence on the population (99%)

Q = 1 – P → Probability of desired feature absence on the population (1%)

D → Sampling error – lot tolerance percent defective (taken as 0.02)

$$n = 1,96^2 * 117 * 0,99 * 0,01 / (117 * 0,02^2 + 1,96^2 * 0,99 * 0,01) = 52,4 \approx 52$$

Quantitative-qualitative data obtained from the interviews are shown by table. All Pearson Chi-Square (χ^2) test results were given at the 95% confidence interval. There is no or very little study interested in yacht furniture on sectoral basis. Therefore, discussions made by favor of limited source of literature and suggestions were given as a conclusion.

2. RESULTS

Some properties of surveyed firms are seen in Table 1 and firms generally manufacture yacht interior on order basis in Turkey. And, this means serial production takes a back seat maybe the insufficient domestic demand. 43 of 57 firms were shipyards and others were subcontractor as seen in table 1. According to this, it can be said that furniture production has been generally done inside the shipyards' production facility. This may make yacht interior more dangerous than normal furniture manufacturing.

Table 1. Some properties of surveyed firms.

Firms' Production types*	Job-order	Serial	Job-order + Serial
	45	2	9
Size of enterprises (according to the number of employees)	Micro scale (<10)	Small scale(<50)	Medium-sized (<250)
Interior production facility	Shipyard	Subcontractor	
Firms' legal structures	Private	Limited	Corporation
Indoor space of facility	≤ 500 m ²	≤ 999 m ²	≥ 1000 m ²
Storage space (for dangerous materials)	Yes	No	
Adequate lighting	42	15	
Fire alarm system	36	21	
Cargo lift (hoist)	18	39	
Ventilation system	14	43	
Heating system	25	32	
Dedusting system	Inside	Outside	No
	28	7	22
	Scarcely ever	Sometimes	Always
Compliance with OHS Rules	5	46	6

*1of 57 was job-order + serial and projects

Compliance with OHS rules in surveyed firms as seen in table 1 and only 6 of 57 firms stated that they always obey the OHS rules. Relation between compliance level and capital structure was significant according to the χ^2 test result of 0.001. Compliance level respectively changed to sometimes or always from scarcely ever or sometimes while capital size rose.

Indoor space of firms was classified into 3 groups as seen in table 1. Material movements increase due to insufficient storage space or randomly stored materials. Accordingly, this can cause additional labor, loss of time, cost rise and decrease of competitiveness. This can be seen in the firms that have small storage area. 35 of 57 firms stated that they have special storage area. But it's observed that lots of them jury rigging for log or flammable material storage. There is a direct proportion between indoor space size and storage space existence as seen in table 2. Also, according to χ^2 test result this proportion is significant with 0 value.

Table 2. Crosstab between Indoor Space Groups and storage place existence.

		Indoor Space Groups (ISP)								
		0-499m ²			500-999m ²			≥ 1000 m ²		
Storage Space	F	within ISP	within storage space	F	within ISP	within storage space	F	within ISP	within storage space	
	Yes	4	25%	11.4%	13	61.9%	37.1%	18	90%	51.4%
No	12	75%	54.5%	8	38.1%	36.4%	2	10%	9.1%	
Total	16	100%	28.1%	21	100%	36.8%	20	100%	35.1%	

Ways of behavior (sometimes, never and always) frequency were 5, 3 and 0 in private firms as seen in table 3. But these properties were respectively 36, 1 and 4 in limited and 5, 1 and 2 in Corporation. In a similar manner, relation between compliance level and firms' legal structure was significant according to the χ^2 test result of 0.012. According to this result it can be said that there is a direct proportion between legal structure and compliance level.

Table 3. Crosstab between Firms' Legal structure (FLS) and compliance with OHS.

Way of behavior	Private			Limited			Corporation					
	F	within FLS	within OHS	F	within FLS	within OHS	F	within FLS	within OHS	F	within FLS	within OHS
	Never	3	37.5%	60%	1	2.4%	20%	1	12.5%	20%	5	8.8%
Sometimes	5	62.5%	10.9%	36	87.8%	78.3%	5	62.5%	10.9%	46	80.7%	100%
Always	0	0%	0%	4	9.8%	66.7%	2	25%	33.3%	6	10.5%	100%
Total	8	100%	14%	41	100%	71.9%	8	100%	14%	57	100%	100%

Table 4 shows that “is there any Organization for Working Accident (OWA)” in the firms. 6 of 14 furniture manufacturing firms (subcontractor) and 22 of 43 shipyards which produce furniture in their own facility have at least one OWA such as first aid team. According to χ^2 test result of 0.011, there is a significant relation between OWA and firms' legal structures as seen in Table 5.

Table 4. Crosstab between Firms' legal structures and Organization for Working Accident (OWA).

OWA		Firms' Legal Structure (FLS)									Total		
		Private			Limited			Corporation					
		F	within	within	F	within	within	F	within	within	F	within	within
		FLS	OWA	FLS	OWA	FLS	OWA	FLS	OWA	FLS	OWA	FLS	OWA
Yes	1	12.5%	3.6%	20	48.8%	71.4%	7	87.5%	25%	28	49.1%	100%	
No	7	87.5%	24.1%	21	51.2%	72.4%	1	12.5%	3.4%	29	50.9%	100%	
Total	8	100%	14%	41	100%	71.9%	8	100%	14%	57	100%	100%	

Table 5 shows that “is there any Corrective and Preventive Action (CAPA)” in surveyed firms. These activities provide productivity by the help of process improvement and may lower the cost. In a similar manner with OWA and way of behavior, there is a significant relation between CAPA and firm’s legal structures according to χ^2 test result of 0.044.

Table 5. Corrective and preventive action (CAPA) * legal structure crosstab.

CAPA		Firms' Legal Structure (FLS)									Total		
		Private			Limited			Corporation					
		F	within	within	F	within	within	F	within	within	F	within	within
		FLS	CAPA	FLS	CAPA	FLS	CAPA	FLS	CAPA	FLS	CAPA	FLS	CAPA
Yes	0	0%	0%	17	41.5%	81%	4	57.1%	19%	21	37.5%	100%	
No	8	100%	22.9%	24	58.5%	68.6%	3	42.9%	8.6%	35	62.5%	100%	
Total	8	100%	14.3%	41	100%	73.2%	7	100%	12.5%	56	100%	100%	

3. DISCUSSION

According to Murphy et al (2004) one of the most commonly encountered chemical hazards is wood dust in boatbuilding. And, Jagels (1985) stated that “*Short-term exposures to certain wood dusts may result in asthma, conjunctivitis, rhinitis, or allergic dermatitis, but long-term effects may include nasal cancer and Hodgkin's disease*” while using natural or treated wood in boatbuilding. According to Brigham and Landrigan (1985) boatbuilders are exposed to toxic woods and to lead. So, machines must have dedusting systems to reduce this hazard risk. As seen in result, 22 of 57 firms had no dedusting system while 35 of 57 have. Ventilation can’t be dissociated from the dedusting system and these two are the complementary elements of providing fresh air. And, according to Crandall and Hartle (1985) absence of control technologies and especially adequate ventilation were the main reason of high exposure of styrene in FRP boat fabrication plants. Likewise, 43 of 57 surveyed firms have only natural

draught and this is a negative effector of working conditions. Therefore, work space must be well ventilated due to breathe comfortable and safer while working. According to Todd (1985) ventilation systems, a dilution system, a local ventilation system, and a push-pull ventilation system, help to reduce styrene density by the use of personal protective equipment (PPE). Way of behavior to use PPE is an important phase to provide personal care. According to Lokhande (2014) irregular use of PPE's were observed in a shipyard in Mumbai. In this study, employees stated that PPE's restrict their flexibility in terms of physical and mental. Because of this reason employees obey the rules sometimes as seen in table 4 even if they had been frequently warned by their chiefs. More flexible and protective PPE's may be helpful to increase their usage.

According to Yirmibesöglü (2009), root causes of fatality or injuries as a result of work accidents are flexible production, informality, subcontracting and therefore consideration of OHS expenses as an obstacle to the maximization of profit by employers in shipbuilding industry. According to Ulay and Engür (2015) "set-ups for safer and more ergonomic workplace to manufacture furniture cause much more cost" perception of some employers and managers, is one of the most important reasons of accidents, illness and labor loss. Because of this perception, physical environment might not have suboptimal conditions. According to Sönmez et al (2009) physical environment conditions directly affect employee security and health, efficiency and work quality. Luminance distribution, noise, vibration, air condition, dust, gas and steam are some of the workspace constituent. The results of this study indicate that heating systems, indoor space size, ventilation and dedusting systems, prevention of noise and fire and cleaning of environment were found insufficient in SME's. But, workplace must be arranged for safer and ergonomic conditions to provide productivity and love or satisfaction of job. And, according to Yıldırım et al (2015) compliance with OHS level rises in direct proportion to love or satisfaction of job.

Identification or assessment of hazardous activities may be directly associated with possibility of components and sub-systems' failure and systems in question (Janicak, 2007) and labor too. First step toward minimization of injury and illness in boatbuilding is hazard identification (Brigham and Landrigan 1985). In this study, CAPA activities have done by 21 of 57 firms. But, corrective and preventive action must be done properly and immediately.

Yacht interior may be considered less dangerous than other works in boatbuilding industry even if interior works are done separately from the yard. But as seen in the table 1, 43 of 57 furniture production facility were inside the yards. Also, furniture installation works are done in the yards or launched yachts even if they done by a subcontractor. Sometimes, these works are done at the same time with other works. Because of this, labor may be exposed to the hazardous materials such as styrene or lead-painted objects.

According to Bilgin et al (2009) occupational health contains 5 basic elements; working environment, working conditions, labor relations, personal characteristic of workers and environmental conditions. This study tried to find out some of these elements and this may be considered as a deficiency to reflect the whole situation.

5. CONCLUSIONS

It can be said that compliance level with OHS is lower than required level in terms of surveyed factors in yacht interior production in Turkey. To prevent visible and invisible loss (deterioration of work piece, mechanical damage of tools or equipment, duty cycle loss, treatment and repair costs, depression and etc.) occur as a result of accidents, injuries, and occupational diseases, all the partners must fulfill their responsibilities. Employees may fulfill their employers' demands not to lose their jobs even if working conditions are poor. If they do not, then they may have anxiety for finding a new job. But indeed, providing healthful and safer working conditions may help employees to protect themselves and therefore employers too. Also, engineering controls or surveillance activities, continuing interactive trainings play an important role to achieve these objectives.

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