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Research Article

## The Hidden Problem of Turkish Occupational Health and Safety System: Occupational Diseases

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**Abstract:** Occupational Accidents and Occupational Diseases are two crucial issues resulting from the work and working environment. According to the latest data of International Labor Organization (ILO), problems at working environment are caused by occupational accidents at 60 % and occupational diseases at 40 %. Contrary to this, 80 % of the deaths resulting from the work is caused by occupational diseases and death resulting from occupational accidents is only 20 % of all of the death cases. In other words, occupational diseases are more crucial facts regarding the impact on the employees.

It is the legal procedure to inform of occupational diseases to Social Security Institution (SSI) within 3 days following the diagnosis is made, as it is done for the occupational accidents. However, in Turkey, majority of the occupational diseases are not registered. This fact hidden the real dimension of the problem and accordingly a perception that there is not a problem of occupational disease in Turkey occurs. Because of this, in this study, real dimensions of occupational diseases in Turkey are introduced. First of all, based on official data, occupational diseases data for the last 10 years (2003-2012) are analyzed. Discrepancies and inconsistencies at SSI statistical yearbooks are determined. By using several international criteria, numbers of cases of occupational disease and death cases resulting from occupational diseases to be registered are estimated. Additionally, Turkey is compared to Germany, regarding the occupational diseases, which can be taken as a reference for this case. In conclusion, several solutions are developed for this issue.

**Keywords:** Occupational diseases; OHS Reporting and registration system; Turkey; Germany.

## 1. INTRODUCTION AND AIM

Occupational Disease (OD), is defined as "*acute or chronic disease, physical or mental disability of the insured caused by the recurrent nature of the work or conditions of the exposure of the work*"<sup>1</sup>. Diseases at the workplaces caused by physical, chemical, biological, ergonomic and psychosocial risk factors are mentioned as occupational diseases. Miners mostly contract to occupational disease such as respiratory insufficiency, pneumoconiosis (occupational lung disease caused by the inhalation of dust).

The recently occurred occupational accidents resulting with massive death in Turkey have shifted the attention to occupational accidents. 301 died under the mine in Soma (May 2014), 10 died in the elevator fell down within Torun Center construction site (September 2014), and 18 were trapped under the mine in Ermenek (October 2014). However, one of the *OHS indicators is occupational diseases* and occupational diseases are highly crucial. Even they are more important than occupational accidents. Because more than 80 % of the work-related death cases are caused by occupational diseases<sup>2-5</sup>.

In Turkey, there are severe difficulties in recording of occupational diseases. Since the consequences of occupational accidents are clear and visible, recording them is relatively easier. Due to the fact determination of the background of the conditions causing the occupational disease is hard; recording may not be possible in some cases. As it cannot be recorded, it is treated as if there is not a problem of occupational disease. The occupational accident has visible impact at the moment it happens. Occupational disease can be visible after a long incubation period and can cause a permanent damage.

In Turkey majority of the occupational diseases cannot be recorded.

This fact hidden real dimension of the problem and a perception that there is not a problem of occupational disease in Turkey occurs. Because of this, in this study, real dimensions of the issue of occupational disease in Turkey are introduced. First of all, based on official data, data of occupational diseases for the last 10 years (2003-2012) are analyzed. Discrepancies and inconsistencies at SSI statistical yearbooks are determined. By using several international criteria, numbers of cases of occupational disease and death cases resulting from occupational diseases to be registered are estimated. Additionally, Turkey is compared to Germany, regarding the occupational diseases that can be taken as a reference for this case. In conclusion, several solutions are developed for this issue.

## 2. RELATIONSHIP BETWEEN WORK AND DISEASE

*The correlation of work and disease can be defined in three categories (Figure-1)*<sup>6</sup>:

**1. Occupational Diseases;** are diseases resulting from factors present in working environment. World Health Organization (WHO) and International Labour Organization (ILO); define group of diseases in which *cause-effect, action-reaction unique for that work*; in-between the harmful factor and human body<sup>7</sup>.

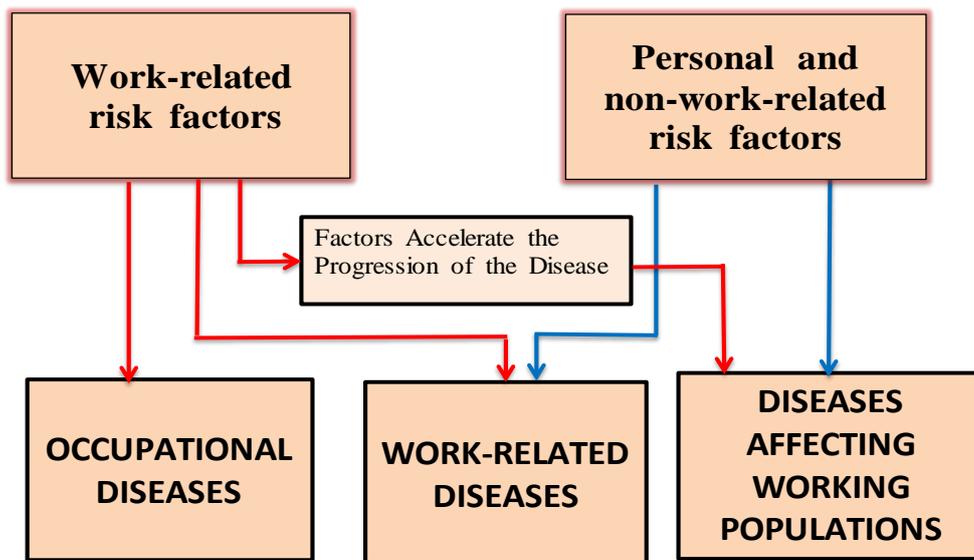
**2. Work-Related Diseases;** are diseases in which *working conditions* play role in progress of the disease together with other risk factors. Physical, chemical, psychosocial and ergonomic problems are examples of these risk factors. Additionally; sensibility, habits, behaviors, nutrition based on familial and genetic factors are other factors.

**3. Diseases Affecting Working Populations;** are diseases increasing due to occupational harmful factors even if it is not related to the work.

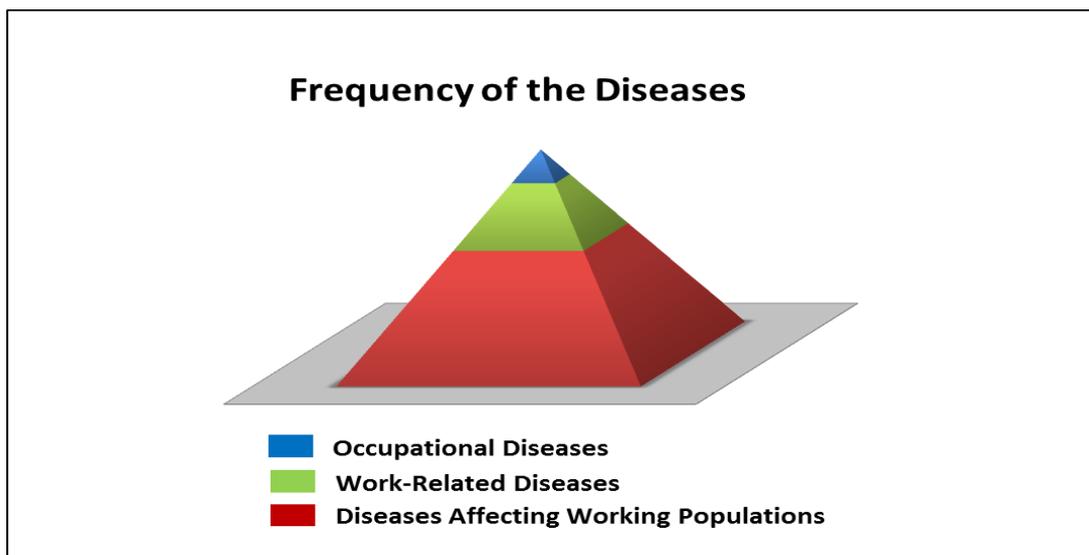
Frequency of the diseases (Figure-2);

- Diseases Affecting Working Populations **Most frequent**,
- Work-Related Diseases **Frequent**,
- Occupational Diseases **Rare**

**Relationship Between Work and Disease**



**Figure-1:** Relationship between Work and Disease



**Figure-2:** Frequency of Diseases

**4. Classification of Occupation Diseases:** Occupational Diseases are classified under 5 main groups in SSI statistical yearbooks.

**A Group:** Occupational diseases caused by chemical substance,

**B Group:** Occupational skin disorders,

**C Group:** Pneumoconiosis and other occupational respiratory system diseases,

**D Group:** Occupational contagious diseases,

**E Group:** Occupational diseases caused by physical factors.

The total of 74 diseases is defined as occupational disease under this group of 5 (**Annex-I**)<sup>8-17</sup>.

#### 5. Analysis of Occupational Diseases Data of Turkey between the Years 2003-2012

**5.1. Analysis of Occupational Diseases Data:** According to the legislation, it is obligatory to make notification to SSI, of all of the occupational diseases the employees are exposed to. These notifications are arranged and classified in accordance with the rules of International Labour Organization (ILO) by SSI and shared with the related parties.

As SSI statistics are evaluated in terms of occupational diseases, data given in **Table-1** are obtained<sup>8-17</sup>.

**Table-1:** The annual distribution of the occupational diseases data in Turkey

YEAR	Number of Insured Workers	Number of Occupational Diseases in Turkey	Deaths Resulting From Occupational. Diseases	Permanent Incapacities Resulting From Occupational. Diseases
2003	5.615.238	440	1	145
2004	6.181.251	384	2	272
2005	6.918.605	519	24	265
2006	7.818.642	574	9	314
2007	8.505.390	1.208	1	406
2008	8.802.989	539	1	242
2009	9.030.202	429	0	217
2010	10.030.810	533	10	109
2011	11.030.939	697	10	123
2012	11.939.620	395	1	173

As data given in **Table-1** are evaluated, results given below are obtained:

- According to SSI records, 5718 occupational disease cases are determined in last 10 years. 87 of the occupational disease case were women (1, 5 %) and 5631 of them were men (98, 5%). At average, 572 new occupational disease cases are recorded per year.
- According to SSI records, 59 employees died as a result of occupational diseases in last 10 years. All of the employees died of occupational diseases are men. 6 new death cases as a result of occupational disease are recorded per year.
- According to SSI records, no woman died of occupational disease in the last 10 years.
- According to SSI records, 2266 employees became permanently disabled as a result of occupational disease in the last 10 years. 19 of the cases of permanently disabled are women (0,8%) and 2247 of them are men (99,2%) At average, 227 new cases of permanently disabled as a result of occupational disease are recorded per year.

- According to SSI records, no employee died due to occupational disease in 2009. In 2003, 2007, 2008 and 2012 only one employee died of occupational disease.
- In the history of Turkey, in year 2007, 1208 cases were recorded as occupational disease, which is the highest amount.

In fact, if the data given in the Table above projects the real situation; the report of occupational diseases in Turkey is really good. But it really does not reflect the fact. Because, according to official records of Germany, 72.927 cases of occupational disease were recorded in 2013, 2343 employees died of occupational diseases<sup>18</sup>. In United States of America, 860.000 occupational disease and 60.300 deaths as a result of occupational disease are recorded per year<sup>7</sup>. According to the latest ILO data, 2.02 million employees die each year from work-related diseases in the world and there are 160 million non-fatal work-related diseases per year are estimated. All of the data suggests that data recorded in Turkey does not project the real facts<sup>19</sup>.

The number of occupational disease estimated for a country can change in accordance with many factors such as;<sup>2,20</sup>

- The intensity of risky work branches in that country,
- The level of use of technology especially at risky work branches,
- OHS policies of the country,
- Responsible attitude of employer-employee and state,
- Healthy working environment.

Risky work branches in Turkey are more as compared to developed countries. Cement industry, mining, construction, textile industry, metal industry, accumulator manufacturing and production of chemicals are the most risky fields in Turkey<sup>3</sup>. Especially in mining and construction sector, the use of technology is very low; these sectors are rather labour-intensive sectors. Thus, it is estimated to have more records of occupational disease in Turkey as compared to many developed countries.

According to a commonly-held criteria that is known as Harrington Criteria, it is estimated to have at minimum 4 and at maximum 12 new occupational disease per a thousand employees in a country<sup>2,3, 20</sup>. As this criterion is considered, only for registered employees, in Turkey even minimum 47.758 new occupational diseases were estimated recorded in 2012, only 395 of them were recorded<sup>21</sup>. This means that the number of recorded occupational disease in Turkey in 2012 is less than 1% of the minimum number defined in Harrington Criteria. The reason that the statistical data of Turkey is inefficient can be explained by medical, legal and social issues<sup>22</sup>.

**Table 2:** Comparison of Harrington Estimation and SSI data

	N <sup>2</sup> of Occupational Diseases	
	Minimum	Maximum
Harrington Criteria	47.758	143.275
SSI Data	395	
Recording Rate	% 0,83	% 0,28

Turkey Statistical Institute (TSI) which is a public institution working with large samples has made two studies named as Occupational Accidents and Work Related Health Problems Research Results in years of 2007 and 2013<sup>22</sup>. According to the research made in 2013, 2, 1 % of the employees responded to the questionnaire stated that they had disease due to work they did within the last 12 months or previously. In other words, according to TSI, even the number of employees stated in the official SSI

data as 11.939.620 is considered, it is estimated that the number of occupational disease shall be approximately 250.732. However, number of recorded occupational disease is only 395. This fact shows that only 0,157 % of the value stated in TSI could be recorded. (Table-3).

**Table-3:** Comparison of TSI and SSI data

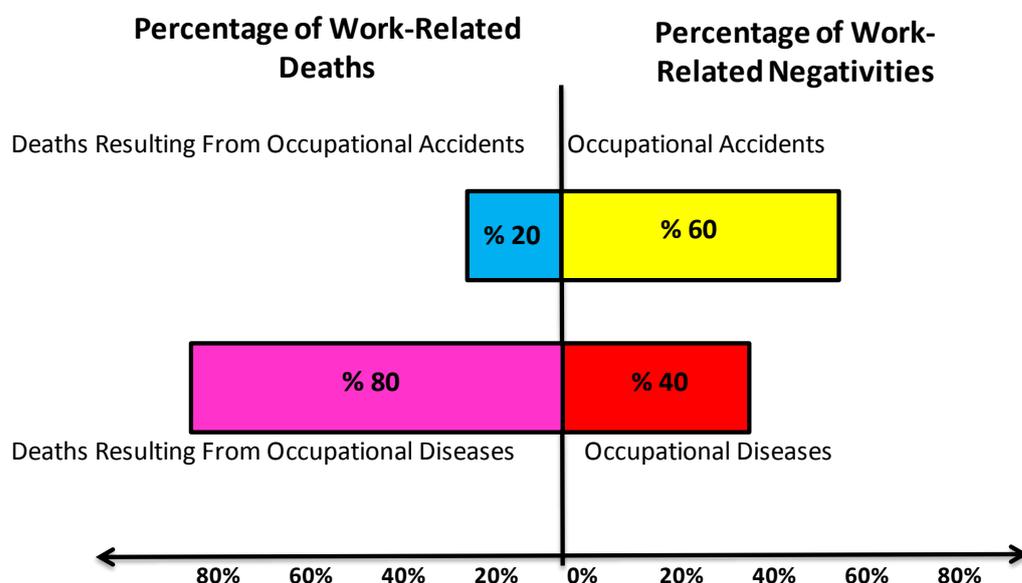
	N'of Occupational Diseases
Value Estimated by TSI	250.732
SSI Data	395
Recording Rate	% 0,157

Additionally, again according to TSI, the ratio of unrecorded employees is approximately 34%. This number is not added to the calculations above<sup>23</sup>.

80-85% of the work-related deaths are caused by occupational diseases (Figure-3)<sup>2-5</sup>. As SSI annual of 2012 is evaluated, it is seen that the distribution of death cases by their causes as it is indicated in Table-4<sup>21</sup>.

**Table-4:** Distribution of Death Cases by Their Causes for the Year 2012

Cause of Death	N'of Cases
Occupational Accidents	744
Occupational Diseases	1
Total	745



**Figure-3:** OHS Indicators

The most accurate data regarding OHS in Turkey is the number of death cases due to occupational accident. As the criterion above is considered, it is estimated that number of death cases due to occupational diseases is 4 times more than occupational accidents. This fact exposes that the number of death cases due to occupational disease shall be approximately 3000 in 2012. The fact that the

number of death case due to occupational disease is 1 in 2012 is another indicator that there is not efficient recording of occupational diseases in Turkey.

According to world data, the share of occupational accidents within occupational accidents and occupational diseases is approximately 60%, and share of occupational disease is approximately 40%<sup>3, 19, 24</sup>. Starting from this point, even approximately 75 thousand occupational accidents, in 2012, that "can be recorded" are considered; minimum 50 thousand occupational disease case shall be proved in accordance with the ratios above.

Additionally, as the Statistical Annual of SSI on Occupational Diseases in 2012 is evaluated, it is seen that even no occupational disease is recorded within the activity group of "**Manufacture of Beverages**" with the code of 11 (NACE), 7 permanent incapacity case due to occupational disease for that activity group are recorded. Similar situation is also present for the activity group with the code of 94 (NACE). As the number of occupational disease case is seen as zero, the number of permanent incapacity case resulting from occupational disease is 6. The fact that although occupational disease is not determined, the permanent incapacity cases resulting from occupational disease are determined reveals the inconsistency in SSI data. Similar inconsistencies are also present in some other activity groups<sup>17</sup>.

Again as 2012 SSI data is evaluated, although occupational diseases are prevalent in sectors of "**Manufacture of Chemicals and Chemical Products**" and "**Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparations**" in the world, it is notable for Turkey that only one case of occupational disease in each of these sectors are determined<sup>17</sup>. Similar situations can be viewed for the other sectors.

In 2005, a board was established by the Ministry of Labor and Social Security under the name of "**National Occupational Health and Safety Council**" by considering EU and ILO rules. This board is the supreme body in the field of occupational health and safety in Turkey. The aim of this board is; to make studies for determining policies and strategies regarding occupational health and safety throughout the country<sup>25</sup>. The council considers national and international developments and conditions of the country in its studies. It takes the basis of collaboration of the members with the aim of rehabilitation of the current conditions of working environment regarding OHS and popularization of the safety culture throughout the country. It provides having the views and thoughts of the parties in formation of country's policies in the field of OHS.

National Occupational Health and Safety Council, within the principles mentioned above, have prepared National Occupational Health and Safety Policy Document-I and National Occupational Health and Safety Policy Document-II<sup>26, 27</sup>. In National OHS Policy Document-II, "**increasing determination of the number of case of occupational diseases that are predicted but not determined by 500%**" is confirmed to be one of the targets of OHS for Turkey in period 2009-2013<sup>27</sup>. The target of this board that is formed mostly by state officials and that is the supreme body regarding OHS in Turkey, to increase the case of occupational disease recorded by 5 times, means approval of not recording occupational diseases, even it is implicitly. Also as the number of recorded occupational diseases is considered, it is frankly seen that this target has not been achieved yet<sup>14-17</sup>.

**4.2. Risky Sectors:** There are risky sectors in terms of occupational diseases in Turkey just as the other parts of the world<sup>19, 28</sup>. The Ministry of Labor and Social Security declares Construction, Mining and Metal sectors as the crucial sectors in terms of combating against occupational accidents and diseases<sup>28</sup>. Because of this, it is beneficial to evaluate statistics of occupational diseases for year 2012 regarding these sectors.

In **Table-5**, **Table-6** and **Table-7**; the distribution of occupational disease, death and permanent incapacity cases resulting from occupational diseases to these three sectors are seen<sup>17</sup>. As **Table-5** is analyzed, it is seen that most of the occupational diseases in Turkey were in Mining Sector in 2012. 78,7% of whole of the occupational diseases occurred in these three sectors. Construction and Mining sectors are two sectors in which the fatal accident incidence rate is the highest in Turkey<sup>28</sup>. However, in none of these three sectors death case due to occupational disease was recorded in Turkey in 2012. The only death case that was recorded was in sector of Warehousing and Support Activities for Transportation.

The sector with the highest permanent incapacity incidence rate is Mining sector. 51,5% of whole of the permanent incapacity cases occur at these three sectors. Accordingly, these three sectors are regarded as sectors in which occupational diseases are more intense in 2012. For the solution of this problem, occupational diseases recorded in these three sectors shall also be evaluated, analyzed and the risks unique for each of the sectors shall be determined. In order to do this, SSI must permit access to whole of the database to scientists.

**Table-5:** Distribution of Occupational Diseases According to the Sectors

	N'of Occupational Diseases	Ratio ( % )
Total Turkey	395	100 %
Mining Sector	236	59,7 %
Metal Sector	45	11,4 %
Construction Sector	30	7,6 %
Others	84	21,3 %

**Table-6:** Distribution of Cases of Deaths Resulting From Occupational Diseases According to the Sectors

	N'of Death Cases	Ratio ( % )
Total Turkey	1	100 %
Mining Sector	0	0 %
Metal Sector	0	0 %
Construction Sector	0	0 %

**Table-7:** Distribution of Cases of Permanently Incapacities Resulting From Occupational Diseases According to the Sectors

	N'of Permanently Incapacities	Ratio ( % )
Total Turkey	173	100 %
Mining Sector	61	35,3 %
Metal Sector	23	13,3 %
Construction Sector	5	2,9 %

**4.3. Analysis of the occupational diseases recorded in the last 10 years:** When chained 5718 occupational diseases in the last 10 years in Turkey were distributed according to the 74 occupational diseases laid down in **Annex-1**, most and least diagnosed occupational diseases' list is seen **Table-8** and **Table-9**. When these tables analyzed, the following consequences might be deduced:

- ✓ Identified diagnosis of more than half of the employees (56,96 %) to whom occupational disease were diagnosed is "**Silicosis and silicotuberculosis**"
- ✓ "**Silicosis and silicotuberculosis**", "**Lead and lead dust**" and "**Arsenic and its compounds**" occupational diseases have share 74, 06 % of all. This means, in Turkey, more or less, the 3/4 of the diagnosed occupational diseases is one of the "**Silicosis and silicotuberculosis**", "**Lead and lead dust**" and "**Arsenic and its compounds**"
- ✓ In Turkey, 6 occupational diseases shown at the **Table-9** have never been diagnosed to anybody in the last 10 years. Likewise, 8 of the occupational diseases seen at the same list have only been identified once in the last 10 years.

This interesting situation at the distribution of the occupational diseases indicates that we should ponder about the diagnosis and record system of the occupational diseases.

#### ANNEX-1: List Of Occupational Diseases

Code	Number	Occupational Diseases
<b>Group A</b>		
A-I A	1	Arsenic and its compounds
A-I B	2	Arsenic with hydrogen or arsine
A-2	3	Beryllium (glusinium) and its compounds
A-3 A	4	Carbon monoxide
A-3 B	5	Phosgene (carbonly chloride)
A-3 C	6	Hydrocyanic acid, Cyanides and compounds thereof
A-4	7	Cadmium and its compounds
A-5	8	Chrome and its compounds
A-6	9	Mercury and its compounds
A-7	10	Manganese and its compounds
A-8 A	11	Nitric acid
A-8 B	12	Nitrous gases
A-8 C	13	Ammonia
A-9	14	Nickel and its compounds
A-10 A	15	Phosporus and inorganic phosporus comp.
A-10 B	16	Organic phosporus and its compounds
A-11 A	17	Lead and lead dust
A-11 B	18	Organic lead and its compounds
A-12 A	19	Carbo sulfide
A-12 B	20	Sulfurous hydrogen
A-12 C	21	Sulfuric acid
A-12 D	22	Sulfur dioxide
A-13	23	Thallium and its compounds
A-14	24	Vanadium and its compounds
A-15 A	25	Chlorine
A-15 B	26	Bromine
A-15 C	27	Iodine
A-15 D	28	Fluorine

A-16	29	Aliphatic or alicyclic hydrocarbones
A-17	30	Halogenated derivatives of the aliphathic or alicyclic hydrocarbhone
A-18 A	31	Alcohols
A-18 B	32	Glycoles
A-18 C	33	Ether and its derivatives
A-18 D	34	Ketone
A-18 E	35	Organic esters
A-19 A	36	Organic acid
A-19 B	37	Aldehyde
A-20 A	38	Aliphatic hydrocarbons nitro derivatives
A-20 B	38	Nitric acid esters
A-21 A	40	Benzol (Benzene) and its homologous
A-21 B	41	Naphtaline and its homologes
A-22	42	Halogenated derivatives of the aromatic hydrocarbones
A-23 A	43	Phenols, their homologues or their hologenated derivatives
A-23 B	44	Halogenated derivatives of the alkylaryl oxides, alky, aril and alkylarylsulfonates
A-23 C	45	Oxidation products of hydroquinen and benzoquinones
A-24	46	Aromatic amines or aromatic hydrazines or halogenated, phenolic, nitrified, nitrated
A-25	47	Nitro and phenel derivations of aromatic hydrocarbons
<b>Group B</b>		
B-1	48	Skin cancers and precancerous skin diseases
B-2	49	Non-cancer skin diseases (contact dermatidis, exema)
<b>Group C</b>		
C-1 A	50	Silicosis and silicotuberculosis
C-1 B	51	Asbestosis
C-1 C	52	Silicatosis
C-1 D	53	Siderosis
C-2	54	Aliminium and its compounds
C-3	55	Hard-metal dust
C-4	56	Thomas slug
C-5	57	Ocupational bronchial asthma
C-6	58	Byssinosis
<b>Group D</b>		
D-1	59	Helminthiasis
D-2	60	Tropical diseases
D-3	61	Infectious or parasitic diseases transmitted to man by animals or remains of animals
D-4	62	Pulmonary tuberculosis
<b>Group E</b>		
E-1	63	Diseases caused by ionizing radiations
E-2	64	Cataracts caused by heat radiation
E-3	65	Hearing impairment caused by noise (Acustic slot)
E-4	66	Diseases caused by atmospheric compression or decompression (polyneuropathy)
E-5	67	Osteoarticular diseases of the hands and wrists caused by mechanical vibration
E-6 A	68	Diseases of articulare bursitis resulting from continuous local pressure
E-6 B	69	Veter, veter case and periost diseases due to over loading
E-6 C	70	Meniskus diseases in mining sites and so
E-6 D	71	Tearing of vertebralprocessis due to over forcing

E-6 E	72	Neural paralyses due to continous local pressure
E-6 F	73	Muscular cramps
E-7	74	Miners' nystagmus

**Table-8:** Most Diagnosed Occupational Diseases in the Last 10 Years in Turkey

Code	Sequence Number	Name of Occupational Diseases	N <sup>o</sup> of recognized occupational diseases	Percentage
C-1 A	50	Silicosis and silicotuberculosis	3257	56,96 %
A-11 A	17	Lead and lead dust	636	11,12 %
A-1 A	1	Arsenic and its compounds	342	5,98 %

**Table-9:** Least Diagnosed Occupational Diseases in the Last 10 Years in Turkey

Code	Sequence Number	Name of Occupational Diseases	N <sup>o</sup> of recognized occupational diseases
A-13	23	Thallium and its compounds	0
A-15 B	26	Bromine	0
A-19 B	37	Aldehyde	0
C-4	56	Thomas slug	0
E-2	64	Cataracts caused by heat radiation	0
E-7	74	Miners' nystagmus	0
A-15 D	28	Fluorine	1
A-18 A	31	Alcohols	1
A-18 D	34	Ketone	1
A-22	42	Halogenated derivatives of the aromatic hydrocarbones	1
A-23 C	45	Oxidation products of hydroquinen and benzoquinones	1
A-24	46	Aromatic amines or aromatic hydrazines or halogenated, phenolic	1
C-6	58	Byssinosis	1
D-1	59	Helminthiasis	1

When chained 2593 occupational diseases in the last 5 years in Turkey were distributed according to the 99 branches of activities laid down in **Annex-2**, the sector lists of the most and least diagnosed occupational disease are seen **Table-10** and **Table-11**. When these tables analyzed, the following consequences might be deduced:

- ✓ In the last 5 years, the most occupational disease diagnosis was set at the "**Mining of Coal and Lignite**" sector. 40 percent of all occupational diseases has solely been recorded at the signified sector.
- ✓ Nearly 63 percent of the all occupational disease has been recorded at the one of the four sectors named "Mining of Coal and Lignite", "Mining of Metal Ores", "Manufacture of Fabricated Metal Products, Except Machinery and Equipment" and "Repair and Installation of Machinery and Equipment".
- ✓ In Turkey, last 5 years, occupational disease have not been diagnosed at the 31 sectors shown in the **Table-11**. Among these, many sectors might also be listed like "Crop and animal

production, hunting and related service activities", "Forestry and logging", "Fishing and aquaculture", "Extraction of crude petroleum and natural gas", "Manufacture of tobacco products" and "Sewerage" where the occupational disease have frequently been seen in the world.

**ANNEX-2: Branches of activities by NACE codes**

<b>Nace Codes</b>	<b>Branches of Activities</b>
01	Crop and animal production, hunting and related service activities
02	Forestry and logging
03	Fishing and aquaculture
05	Mining of coal and lignite
06	Extraction of crude petroleum and natural gas
07	Mining of metal ores
08	Other mining and quarrying
09	Mining support service activities
10	Manufacture of food products
11	Manufacture of beverages
12	Manufacture of tobacco products
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
22	Manufacture of rubber and plastic products
23	Manufacture of other non-metallic mineral products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
32	Other manufacturing
33	Repair and installation of machinery and equipment
35	Electricity, gas, steam and air conditioning supply
36	Water collection, treatment and supply
37	Sewerage
38	Waster collection, treatment and disposal activities; materials recovery
39	Remediation activities and other waste management services
41	Construction of buildings
42	Civil Engineering
43	Specialised construction activities
45	Wholesale and retail trade and repair of motor vehicles and motorcycles
46	Wholesale trade, except of motor vehicles and motorcycles

47	Retail trade, except of motor vehicles and motorcycles
49	Land transport and transport via pipelines
50	Water transport
51	Air transport
52	Warehousing and support activities for transportation
53	Postal and courier activities
55	Accommodation
56	Food and beverage service activities
58	Publishing activities
59	Motion picture, video and television programme production, sound recording and music publishing activities
60	Programming and broadcasting activities
61	Telecommunications
62	Computer programming, consultancy and related activities
63	Information service activities
64	Financial service activities, except insurance and pension funding
65	Insurance, reinsurance and pension funding, except compulsory social security
66	Activities auxiliary to financial services and insurance activities
68	Real estate activities
69	Legal and accounting activities
70	Activities of head offices; management consultancy activities
71	Architectural and engineering activities; technical testing and analysis
72	Scientific research and development
73	Advertising and market research
74	Other Professional, scientific and technical activities
75	Veterinary activities
77	Rental and leasing activities
78	Employment activities
79	Travel agency, tour operator and other reservation service and related activities
80	Security and investigation activities
81	Services to buildings and landscape activities
82	Office administrative, Office support and other business support activities
84	Public administration and defense; compulsory social security
85	Education
86	Human Health activities
87	Residential care activities
88	Social work activities without accommodation
90	Creative, arts and entertainment activities
91	Libraries, archives, museums and other cultural activities
92	Gambling and betting activities
93	Sports activities and amusement and recreation activities
94	Activities of membership organisations
95	Repair of computers and personal and household goods
96	Other personal service activities
97	Activities of household as employers of domestic personnel
98	Undifferentiated goods-and services-producing activities of private households for own use
99	Activities of extraterritorial organisations and bodies
100	Unknown

**Table-10:** Sectors in Which Occupational Diseases Mostly Diagnosed in Last 5 Years in Turkey

Activity Code	Branches of Activities By NACE Codes (Sectors)	N'of recognized occupational diseases	Percentage
05	Mining of Coal and Lignite	1022	39,41%
07	Mining of Metal Ores	262	10,10%
25	Manufacture of Fabricated Metal Products, Except Machinery and Equipment	183	7,06%
33	Repair and Installation of Machinery and Equipment	170	6,56%
	<b>Total</b>	1637	63,13%

**Table-11:** Sectors in Which No Occupational Diseases Diagnosed in Last 5 Years in Turkey

Activity Code	Branches of Activities By NACE Codes (Sectors)
01	<b>Crop and animal production, hunting and related service activities</b>
02	<b>Forestry and logging</b>
03	<b>Fishing and aquaculture</b>
06	<b>Extraction of crude petroleum and natural gas</b>
09	Mining support service activities
12	<b>Manufacture of tobacco products</b>
37	<b>Sewerage</b>
39	Remediation activities and other waste management services
51	Air transport
53	Postal and courier activities
56	Food and beverage service activities
59	Motion picture, video and television programme production, sound recording and music publishing activities
60	Programming and broadcasting activities
61	Telecommunications
62	Computer programming, consultancy and related activities
63	Information service activities
65	Insurance, reinsurance and pension funding, except compulsory social security
66	Activities auxiliary to financial services and insurance activities
68	Real estate activities
73	Advertising and market research
74	Other Professional, scientific and technical activities
75	Veterinary activities
78	Employment activities
79	Travel agency, tour operator and other reservation service and related activities
84	Public administration and defense; compulsory social security
87	Residential care activities
88	Social work activities without accommodation
91	Libraries, archives, museums and other cultural activities
93	Sports activities and amusement and recreation activities
97	Activities of household as employers of domestic personnel
99	Activities of extraterritorial organizations and bodies

**4.4. Comparison of Turkey and Germany in terms of the Occupational Diseases:** The countries becoming prominent regarding OHS are foremost northern countries (Sweden, Switzerland, Norway, Finland) and Germany, United Kingdom, United States of America, Japan and Canada. Germany is a country in which OHS mechanisms operate wholesomely. The demographic structure is similar to Turkey; it has the population of approximately 82 million. Its economy depends on mainly industry. In this regard, it is the most suitable country to be compared to Turkey.

As the DGUV (Deutsche Gesetzliche Unfallversicherung-The German Social Accident Insurance) statistics are evaluated in terms of occupational diseases, data seen in **Table-12** are obtained<sup>18,29-37</sup>.

**Table-12:** The annual distribution of the occupational diseases data in Germany

YEAR	Number of Insured Workers	Number of Occupational Diseases	Deaths Resulting From Occupational Diseases
2003	34.985.339	68.452	2593
2004	34.415.187	66.316	2547
2005	35.200.557	63.909	2564
2006	35.791.823	61.059	2543
2007	36.259.598	59.643	2315
2008	36.462.823	59.468	2391
2009	36.941.169	62.702	2767
2010	37.475.591	69.186	2486
2011	37.957.013	71.738	2548
2012	38.873.944	71.389	2454

According to data of DGUV in Germany, in the last 10 years, 653.862 occupational disease cases are determined. This means that at average, annually, 65386 new diagnosis of occupational disease are made. Again according to DGUV data, in Germany, in the last ten years, 25.208 died of occupational disease. This means that in Germany 2521 die of occupational disease per year.

It is not so meaningful to compare the data of occupational disease of two countries by considering only absolute numbers. In 2012 Turkey had employees of approximately 12 million but in Germany this number was approximately 39 million. Due to this fact, two separate comparison criteria are used such as *General Incidence Rate of Occupational Diseases (GIROD)* and *Fatal Incidence Rate of Occupational Diseases (FIROD)*.

*GIROD* is a criteria indicating how many of 100.000 employees are subject to occupational disease in a calendar year. *FIROD* is another criteria indicating how many of 1.000.000 employees die due to occupational diseases in a calendar year.

- *GIROD* represents the number of occupational diseases per 100.000 workers in one calendar year.
- *FIROD* represents number of deaths resulting from occupational diseases per 1000000 workers in one calendar year.

*GIROD* and *FIROD* values calculated for Turkey and Germany are given in **Table-13**.

**Table-13:** GIROD and FIROD values calculated for Turkey and Germany

YEAR	GIROD values (TURKEY)	GIROD values (GERMANY)	FIROD values (TURKEY)	FIROD values (GERMANY)
2003	7,84	198,94	0,18	75,36
2004	6,21	189,55	0,32	72,80
2005	7,50	185,70	3,47	74,50
2006	7,34	173,46	1,15	72,24
2007	14,20	166,64	0,12	64,68
2008	6,12	164,01	0,11	65,94
2009	4,75	171,96	0,00	75,89
2010	5,31	187,29	1,00	67,30
2011	6,32	191,43	0,91	67,99
2012	3,31	188,08	0,08	64,65

It is possible to make comment on Table-13 in two ways. The first one is that Turkey is at a better point compared to Germany, in terms of both the GIROD and FIROD. Such that; in 2012 the general incidence rate of occupational disease in Germany was 57 times and the fatal incidence rate of occupational disease was 808 times more than Turkey. This is, indeed, not a logical statement. Another alternative is, unfortunately, majority of the occupational diseases in Turkey are not recorded. This option is a more logical explanation.

## 5. DISCUSSION OF RESULTS AND RECOMMENDATIONS

**General view of occupational diseases in Turkey can be summarized as follows;**

- Approximately whole of the occupational diseases cannot be determined,
- Approximately whole of the death cases due to occupational diseases cannot be determined,
- Approximately whole of the permanent incapacity cases cannot be determined.

As the result of these, there has been the perception that Turkey has a good performance regarding occupational diseases, which is one of the indicators of OHS. This situation causes insensitivity by employees, employers and state officials that are parties of OHS on occupational diseases. In fact; any occupational disease that is not determined on time causes the progress of that disease and in time it becomes permanent incapacity of the worker and even causes to death. In addition to this, it avoids early diagnosis of other employees in the same working place. Also occupational diseases bring a serious burden to national economy. The direct cost of occupational diseases only on Turkish Social Security System can be stated as;

- ✓ Temporary Incapacity Allowance and treatment costs for repeated hospital applications,
- ✓ Permanent Incapacity Allowance for each case that cannot be diagnosed earlier,
- ✓ Premium loss due to early retirement of the employee,
- ✓ Payment without premium for each employee having incapacity.

**The reasons of not being able to record occupational diseases;**

- There are three occupational disease hospitals in Ankara, Istanbul and Zonguldak. Additionally, since 2008 **State University Hospitals** and since 2011 the **Ministry of Health Training and Research Hospitals** have the authority to make Medical Diagnosis of

Occupational Diseases. In other words, recently, there are approximately 150 institutions with the authority of making "medical diagnosis" of occupational diseases. In Turkey, there is no other notification of occupational disease except 3 occupational disease hospitals in 2012. In 2012, 221 of the recorded cases of occupational disease of 395 were recorded in Zonguldak Occupational Diseases Hospital, 61 in Ankara Occupational Diseases Hospital, and 21 in Istanbul Occupational Diseases Hospital. Following 2008, by increasing the number of hospitals with the authority of making medical diagnosis, it was aimed to contribute to increase in the diagnosis of occupational diseases throughout the country. However, it is seen in the data of 2012 that; State University Hospitals and Ministry of Health Training and Research Hospitals do not function their responsibilities efficiently.

- The legislation is not known sufficiently.
- The insufficiency of the knowledge and sensitivity of both workplace doctors and doctors with the authority to make medical diagnosis on occupational diseases.
- The insufficiency of the diagnosis of occupational disease by measurements of working environment and supporting by questions asked to the patient by the doctor to determine the relation between the disease-work.
- Insufficiencies in recording system of occupational diseases.
- The employees do not have sufficient and accurate knowledge about occupational disease.
- The fear of the employees to lose right and position as the result of the diagnosis of occupational disease.
- The fear of the employees to be declared as disabled or crippled.
- The lack of doctor or support of a syndicate giving confidence to the employees.
- The fear of the employees for the breakdown of the relation with the employer and loss of job.
- The Ministry of Labor and Social Security does not make efficient surveillance.
- The sanctions of The Ministry of Labor and Social Security are considered as inadequate<sup>7,38</sup>.

**Underreporting** causes lack of information about existing safety problems and hinders preventive actions. Unfortunately, majority of the occupational diseases occurring in Turkey are not being recorded. As in the rest of the world, underreporting of the occupational diseases emerges as an important problem in Turkey as well. While about 70.000 occupational diseases per year are being recorded in Germany with population of 82 million, only 395 occupational diseases are being taken under record in Turkey with population of 76 million. Therefore, it is an undeniable fact that the real situation in Turkey in terms of occupational diseases, is a lot higher than the numbers given in this study.

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