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# Appraisal of Health and Safety Performance of Construction Workers on Sites

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**Abstract:** In construction sites many accidents and injuries occurred due to negligence or uncared attitudes of construction workers, consultants and owners. This research work intends to examine the health and safety performance of construction workers on construction sites. Information obtained through personal interview of the construction workers of the visited construction sites, questionnaire administration and review of existing literature and journals which the data base. While the data analysis showed the level of factors that affect the health and safety performance of construction workers on construction sites, the fatal injuries among construction workers on construction sites, the rate of fatal injuries among trades on construction sites and identification of chemical, physical, and other hazards available at the construction sites. It was concluded that factors that affect the health and safety performance of construction workers are poor administrative and management commitment, application of health and safety factors in organisation, role of government and professional bodies, poor planning and co-ordination. The fatal injuries among construction workers includes breathing in asbestos fibres, suffering a bad back from handling heavy materials, suffering hearing loss from loud noise, motor vehicle crashes and falls from height. The level of fatal injuries among traders on construction sites revealed that masons/bricklayers are most liable to fatal injuries among trade's men on construction site. Identification of chemical, physical and other hazards available at the construction work sites include cement dermatitis, awkward postures, heavy loads, noise, knee trauma, stress, isolation, glue and glue vapour. It was recommended that the management of construction companies need to be aware of, and understand safety issues and their importance in order to ensure healthful and safe working practices, training and retraining of construction workers to maintain effective health and safety practices, consideration of health, safety and welfare of their workers and government legislation to protect the health, safety and welfare of workers.

**Keywords:** *appraisal, health, safety, performance, construction workers,*

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## I. INTRODUCTION

The construction industry is one of the world's major industries. Its achievement in rebuilding areas devastated by both natural and man-made disasters, and in providing power, services and communications to meet the rising needs and expectations of people throughout the world, has conferred great benefits on the human race [1]. Despite mechanization, construction remains a major employer of labour – it often employs between 9 and 12 per cent of a country's working population, and sometimes as much as 20 per cent.

According to [2], accidents on building construction sites should be a major concern to everybody in the construction industry. It is a pity that we have not properly addressed the issue and safety in most of the developing countries. To support this statement is the non-availability of site construction regulations to take care of site personnel in Nigeria. The improvement of safety health and working conditions depends ultimately upon people working together, whether government employers or workers safety problem area coordinating controlling and directing the safety activity at the work on site. All aimed at the prevention of accident and health within the built environment accident prevention is often misunderstanding for most people believe wrongly that the word accident is synonymous with injure.

Health is the level of functional or metabolic efficiency of a living organism. In humans it is the ability of individuals or communities to adapt and self-manage when facing physical, mental or social challenges [3]. The World Health Organization (WHO) defined health in its broader sense in its 1948 constitution as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity [4], [5]." This definition has been subject to controversy, in particular as lacking operational value and because of

the problem created by use of the word "complete" [6],[7]. Other definitions have been proposed, among which a recent definition that correlates health and personal satisfaction [8]. Safety is the state of being free from danger, the condition of being protected against physical, social, spiritual, financial, political, emotional, occupational, psychological, educational, or other types or consequences of failure, damage, error, accidents, harm, or any other event that could be considered non-desirable. Safety can also be defined to be the control of recognized hazards to achieve an acceptable level of risk. This can take the form of being protected from the event or from exposure to something that causes health or economical losses. It can include protection of people or of possessions. Health is a state of physical and mental well-being - including the absence of disease or infirmity.

Safety relates to the absence of physical or psychological injury or harm and often extends to the absence of damage to property. There is a substantial area of common meaning or overlap in these terms because health often refers to long-term issues while safety refers to issues with immediate impact. Some issue have both and some have intermediate impact, being seeing as health by some and as safety by others. Examples of the latter may include noise and ergonomics. Safety is the condition of a "steady state" of an organization or place doing what it is supposed to do. "What it is supposed to do" is defined in terms of public codes and standards, associated architectural and engineering designs, corporate vision and mission statements, and operational plans and personnel policies. For any organization, place, or function, large or small, safety is a normative concept. It complies with situation-specific definitions of what is expected and acceptable [9].

In the world of everyday affairs, not all goes as planned. Some entity's steady state is challenged. This is where security science, which is of more recent date, enters. Drawing from the definition of safety, then: Security is the process or means, physical or human, of delaying, preventing, and otherwise protecting against external or internal, defects, dangers, loss, criminals, and other individuals or actions that threaten, hinder or destroy an organization's "steady state," and deprive it of its intended purpose for being.

## II. OBJECTIVES OF THE STUDY

The aim of this research paper is intends to examine the health and safety performance of construction workers on site and to enforce safety strategies which had been in existence but neglected by the operation which has led to incessant serious accident on the site through the following stated objectives.

1. To determine the factors that affects the Health and Safety performance on Construction sites
2. To know the rate of fatal injuries among construction workers on construction sites
3. To evaluate the rate of fatal injuries among trades on construction sites
4. To identify the chemical, physical, and other hazards available at the construction work sites

## III. LITERATURE REVIEW

The construction industry is responsible for the production and manufacturing of construction product such as buildings, roads, dams, tunnels, railway tracks, airports and harbours. Construction and maintenance is dangerous by its nature, and increased emphasis needs to be placed on safety in order to reduce the cost to the industry. In the process of construction, every year, there are numerous accidents that occur at new construction sites as well as in buildings undergoing refurbishment. Cases of accidents like people falling off from heights, inhaling of toxin from construction material like paints, electrocution and building collapse abound. Accident occurrences on construction sites were known to cause some workers to lose one or two member of their body thereby incapacitating them to fend for their families and in most cases leading to the stoppage of the children's education. These call for the need to appraising health and safety control measure of the construction industry.

An investigation into cases of construction injuries shows that "human ware" accounts for much of the underlying causes of site accidents [10] in [11]. The research suggests that the major causes of safety failure are: inadequate safety education, inadequate instruction, poor housekeeping and disregard of the rule and regulations. According to [10], employers' and employees' attitudes play a major part in safety on site. Here are the causes of site accidents which includes among others, inadequate supervision by construction professionals, fall from heights, electrocution, falling objects, machines, ignorance of site visitors and natural and climate hazards.

The identified chemical, physical, and other hazards available at the construction work sites includes cement dermatitis, awkward postures, heavy loads, stress, isolation, whole-body vibration, diesel engine exhaust, asbestos, synthetic fibres, noise, silica dust, led fumes and particles, welding fumes, knee trauma, glue and glue vapour, solvent vapours, toxic metals in pigments, paint additives, working at height, wood dust, heavy loads and repetitive motion.

## IV. RESEARCH METHOD

A well-structured questionnaire was the main research instrument used and this augmented with oral interview of construction workers granted. Sixty (60) questionnaire were directly distributed with the intention of getting responses from construction workers, clients, consultants (building professionals) and contractors on construction sites visited towards determining the factors that affects the health and safety performance on construction sites, the rate of fatal injuries among construction workers on construction sites, the rate of fatal injuries among trades on construction sites and identification of the chemical, physical, and other hazards available at the construction work sites.

The questions were simple and straightforward and the language used was at a level commensurate with the survey population in order to increase the response level. Data collected were presented in tabular form and simple statistical tools were used in order to help the researcher opportunities to identify above mentioned factors on health and safety performance on construction sites.

The relative significance index ranking (RSI) was used for ranking of the factors studied. [14] Bakhray gave an equation that could be useful for determining Relative Significance Index (RSI) in prevalence data as:

$$RSI = \frac{\sum \mu}{AN}$$

Where μ is the weighting given to each factor by respondents;

A is the highest weight (i.e. 5 in this case);

N is the total number of respondents

But for this type of research work where a 5-point scale was used, the RSI shall be calculated via the equation:

$$RSI = \frac{5a + 4b + 3c + 2d + 1e}{jN} \qquad (0 \leq \text{index} \leq 1)$$

Where: a = number of respondents ‘‘strongly agree’’,

b = number of respondents ‘‘agree’’

c = number of respondents ‘‘less agree’’

d = number of respondents ‘‘disagree’’

e = number of respondents ‘‘strongly disagree’’

N = sample size = 60

j = number of response categories = 5

For instance for item 7 on the original questionnaire, Poor planning and co-ordination, 9 respondents gave “strongly agree”, 21 respondents gave “agree”, 10 respondents gave “less agree”, 9 respondents gave “disagree” and 11 respondents gave “strongly disagree”. The relative significance index is given as:

$$RSI = \frac{(9 \times 5) + (21 \times 4) + (10 \times 3) + (9 \times 2) + (11 \times 1)}{(5 \times 60)} = 0.627$$

The results off other computations are as shown in table 3 as applicable to tables 4, 5 and 6 respectively.

## V. DATA ANALYSIS AND RESULTS

The data are hereby presented

### 5.1 Respondents Profile

**Table 1: Sex**

| Sex | Frequency | Percentage |
|---|---|---|
| Male | 46 | 76.67 |
| Female | 14 | 23.33 |
| Total | 60 | 100.0 |

**Source: Field Survey, 2015**

Table 1 showed the gender of the respondents. It showed that forty six (76.67%) are male and fourteen (23.33%) are female. The result shows the representation of genders in the construction industry in the study area.

**Table 2: Length of service**

| Years | Midpoint (x) | Frequency (f) | Fx | Percentage |
|---|---|---|---|---|
| 1-5 | 6 | 14 | 84 | 10.62 |
| 6-10 | 8 | 11 | 88 | 11.13 |
| 11-15 | 13 | 10 | 130 | 16.43 |
| 16-20 | 18 | 12 | 216 | 27.31 |
| above 21 | 21 | 13 | 273 | 34.51 |
| Total | | 60 | 791 | 100.0 |

Mean = $\sum fx/\sum f$= 791/60 = 13.18

**Source: Field Survey, 2018**

Table 2 shows the respondents mean year of experience estimated at approximately thirteen years (13yrs). With this average working experience of thirteen years, respondents are deemed experienced enough to supply reliable data for the research.

**5.2 Factors that affect the Health and Safety performance on Construction sites**

**Table 3: Factors that affect the health and safety performance on construction sites**

| Factor Description | 1 | 2 | 3 | 4 | 5 | Total | TWV | RSI | Rank |
|---|---|---|---|---|---|---|---|---|---|
| **Administrative and Management commitment** | 3 | 4 | 6 | 17 | 30 | 60 | 247 | 0.823 | 1 |
| **Role of Government and Professional Bodies** | 4 | 3 | 12 | 21 | 20 | 60 | 230 | 0.767 | 3 |
| **Nature of project** | 4 | 5 | 7 | 34 | 10 | 60 | 221 | 0.737 | 6 |
| **Historic, human and psychological climate** | 6 | 7 | 16 | 19 | 12 | 60 | 204 | 0.680 | 13 |
| **Application of health and safety factors in organisation** | 5 | 4 | 8 | 15 | 28 | 60 | 237 | 0.790 | 2 |
| **Project location is safe to reach** | 6 | 7 | 9 | 20 | 18 | 60 | 217 | 0.723 | 8 |
| **Poor planning and co-ordination** | 11 | 9 | 10 | 21 | 9 | 60 | 188 | 0.627 | 17 |
| **Poor communication between sites** | 10 | 9 | 11 | 18 | 12 | 60 | 193 | 0.643 | 16 |
| **Reportable accidents rate in project** | 7 | 10 | 9 | 18 | 16 | 60 | 206 | 0.687 | 12 |
| **Assurance rate of project** | 5 | 12 | 14 | 20 | 9 | 60 | 196 | 0.653 | 15 |
| **Organisation structure** | 5 | 6 | 5 | 23 | 21 | 60 | 229 | 0.763 | 4 |
| **Safety inspections** | 7 | 8 | 3 | 18 | 24 | 60 | 224 | 0.747 | 5 |
| **Safety meetings** | 7 | 5 | 12 | 19 | 17 | 60 | 214 | 0.713 | 9 |
| **Safety records and reports** | 8 | 6 | 5 | 23 | 18 | 60 | 217 | 0.723 | 8 |
| **Incentives** | 9 | 7 | 10 | 23 | 11 | 60 | 200 | 0.667 | 14 |
| **Health and safety (H & S) education and training** | 5 | 8 | 11 | 14 | 22 | 60 | 220 | 0.733 | 7 |
| **Economic investment** | 7 | 6 | 13 | 19 | 15 | 60 | 209 | 0.697 | 11 |
| **Medical facilities** | 9 | 6 | 8 | 18 | 19 | 60 | 212 | 0.707 | 10 |

**RSI=Relative Significance Index, TWV=Total Weight Value**

**Source: Field Survey, 2018**

Table 3 showed the Relative Significance Index (RSI) of the level of factors that affect the health and safety performance on construction sites. It revealed that Administrative and Management commitment ranked first with RSI value of 0.823 (i.e. 82.3 percent significance), Application of health and safety factors in organisation ranked second with RSI value of 0.79, role of government and professional bodies ranked third with RSI value of 0.767. While Poor planning and co-ordination ranked least with RSI value of 0.627. The result also showed that all the factors are significant with the least factor having 62.7 (0.627) percent significance.

**5.3 The fatal injuries among construction workers on construction sites**

**Table 4: The fatal injuries among construction workers on construction sites**

| FATAL INJURIES | 1 | 2 | 3 | 4 | 5 | Total | TWV | RSI | Rank |
|---|---|---|---|---|---|---|---|---|---|
| **Falls from a height** | 20 | 6 | 9 | 13 | 12 | 60 | 171 | 0.570 | 8 |
| **Involved in a vehicle accident** | 10 | 16 | 9 | 11 | 14 | 60 | 183 | 0.610 | 5 |
| **Contact with objects or equipment (Struck by an object or caught in machinery or material)** | 10 | 10 | 24 | 5 | 11 | 60 | 177 | 0.590 | 7 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Exposure to harmful substances (Electrocution from contact with electrical wiring, overhead power lines or electrically powered machinery or hard tools)** | 15 | 16 | 9 | 11 | 9 | 60 | 163 | 0.543 | 9 |
| **Excavation accidents ( Being buried during excavation work)** | 13 | 9 | 12 | 10 | 16 | 60 | 187 | 0.623 | 4 |
| **Being struck by falling materials** | 12 | 14 | 10 | 13 | 11 | 60 | 177 | 0.590 | 7 |
| **Breathing in asbestos fibres** | 6 | 9 | 16 | 16 | 13 | 60 | 201 | 0.670 | 1 |
| **Motor vehicle crashes** | 11 | 7 | 16 | 15 | 11 | 60 | 188 | 0.627 | 3 |
| **Suffering a bad back from handling heavy materials** | 7 | 13 | 10 | 12 | 18 | 60 | 201 | 0.670 | 1 |
| **Coming into contact with dangerous substances** | 11 | 14 | 14 | 6 | 15 | 60 | 180 | 0.600 | 6 |
| **Suffering hearing loss from loud noise** | 9 | 13 | 10 | 11 | 17 | 60 | 194 | 0.647 | 2 |

**RSI=Relative Significance Index, TWV=Total Weight Value**
**Source: Field Survey, 2018**

Table 4 revealed that breathing in asbestos fibres and suffering a bad back from handling heavy materials were ranked first with RSI value of 0.67 (i.e.67 percent significance), suffering hearing loss from loud noise ranked second with RSI value of 0.647 and motor vehicle crashes ranked third with RSI value of 0.627. While falls from height ranked last with RSI value of 0.57. The result also showed that all the factors are significant with the least factor having 57 (0.57) percent significance.

### 5.4 The rate of fatal injuries among trades on construction sites

**Table 5: The rate of fatal injuries among trades on construction sites**

| TRADES | 1 | 2 | 3 | 4 | 5 | Total | TWV | RSI | Rank |
|---|---|---|---|---|---|---|---|---|---|
| **Masons/Bricklayers** | 8 | 7 | 3 | 12 | 30 | 60 | 229 | 0.763 | 1 |
| **Concrete workers** | 11 | 6 | 8 | 11 | 24 | 60 | 211 | 0.703 | 3 |
| **Crane Drivers** | 8 | 7 | 8 | 23 | 14 | 60 | 208 | 0.693 | 6 |
| **Drivers** | 7 | 6 | 7 | 31 | 9 | 60 | 209 | 0.697 | 5 |
| **Insulators** | 2 | 10 | 30 | 4 | 14 | 60 | 198 | 0.660 | 10 |
| **Machine Operators** | 8 | 6 | 15 | 21 | 10 | 60 | 199 | 0.663 | 9 |
| **Plumbers** | 8 | 10 | 9 | 15 | 18 | 60 | 205 | 0.683 | 8 |
| **Tilers** | 7 | 8 | 10 | 11 | 24 | 60 | 217 | 0.723 | 2 |
| **Painters** | 9 | 8 | 9 | 15 | 19 | 60 | 207 | 0.690 | 7 |
| **Rock workers** | 14 | 8 | 12 | 9 | 17 | 60 | 187 | 0.623 | 11 |
| **Structural steel workers** | 6 | 7 | 16 | 14 | 17 | 60 | 209 | 0.697 | 5 |
| **Sheet metal workers** | 8 | 7 | 17 | 15 | 13 | 60 | 198 | 0.660 | 10 |
| **Wood workers/Carpenters** | 5 | 9 | 15 | 13 | 18 | 60 | 210 | 0.700 | 4 |

**RSI=Relative Significance Index, TWV=Total Weight Value**
**Source: Field Survey, 2018**

Table 5 showed the Relative Significance Index (RSI) of the level of fatal injuries among traders on construction sites. It revealed that Masons/Bricklayers ranked first with RSI value of 0.763 (i.e.76.3 percent significance), Tilers ranked second with RSI value of 0.723, concrete workers ranked third with RSI value of 0.703. While rock workers ranked last with RSI value of 0.623. The result also showed that all the traders are significant with the least factor having 62.3 (0.623) percent significance. The masons/bricklayers are most liable to fatal injuries among trade's men on construction site, while the rock workers are less exposed to risk or danger.

### 5.5 Identification of chemical, physical, and other hazards available at the construction work sites

**Table 6: Identification of chemical, physical, and other hazards available at the construction work sites**

| TRADES/HAZARDS | 1 | 2 | 3 | 4 | 5 | Total | TWV | RSI | Rank |
|---|---|---|---|---|---|---|---|---|---|
| **Masons/Bricklayers (Cement dermatitis, awkward postures, heavy loads)** | 4 | 6 | 10 | 14 | 26 | 60 | 232 | 0.773 | 1 |
| **Concrete workers (Awkward posture)** | 7 | 8 | 9 | 21 | 15 | 60 | 209 | 0.697 | 6 |
| **Crane Drivers (Stress, isolation)** | 9 | 7 | 16 | 21 | 7 | 60 | 190 | 0.633 | 13 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Drivers (Whole-body vibration, diesel engine exhaust)** | 10 | 8 | 11 | 19 | 12 | 60 | 195 | 0.650 | 9 |
| **Insulators( Asbestos, synthetic fibres, awkward postures)** | 7 | 9 | 21 | 11 | 12 | 60 | 192 | 0.640 | 12 |
| **Machine Operators (Noise, whole-body vibration, silica dust)** | 9 | 7 | 8 | 16 | 20 | 60 | 211 | 0.703 | 5 |
| **Plumbers(Lead fumes and particles, welding fumes)** | 7 | 9 | 14 | 23 | 7 | 60 | 194 | 0.647 | 10 |
| **Tilers(Knee trauma, awkward postures, glue and glue vapour)** | 7 | 10 | 7 | 12 | 24 | 60 | 216 | 0.720 | 3 |
| **Painters (Solvent vapours, toxic metals in pigments, paint additives )** | 4 | 10 | 13 | 14 | 19 | 60 | 214 | 0.713 | 4 |
| **Rock workers (Silica dust, whole-body vibration, noise)** | 8 | 9 | 14 | 20 | 9 | 60 | 193 | 0.643 | 11 |
| **Structural steel workers (Awkward postures, heavy loads, working at heights)** | 7 | 9 | 8 | 25 | 11 | 60 | 204 | 0.680 | 8 |
| **Sheet metal workers (Awkward postures, heavy loads, noise)** | 5 | 3 | 9 | 26 | 17 | 60 | 227 | 0.757 | 2 |
| **Wood workers/Carpenters (Wood dust, heavy loads, repetitive motion)** | 9 | 8 | 10 | 15 | 18 | 60 | 205 | 0.683 | 7 |

**RSI=Relative Significance Index, TWV=Total Weight Value**
**Source: Field Survey, 2018**

Table 6 showed the relative significance index (RSI) in identification of chemical, physical, and other hazards Available at the construction Work Sites. It revealed that masons/bricklayers (cement dermatitis, awkward postures, heavy loads) ranked first with RSI value of 0.773 (i.e. 77.3%)significance, sheet metal workers (awkward postures, heavy loads noise) ranked second with RSI value of 0.757 and tilers(knee trauma, awkward postures, glue and glue vapour) ranked third with RSI value of 0.72. While crane drivers (Stress, isolation) ranked last with RSI value of 0.633. The result also showed that all the traders are significant with the least factor having 63.3 (0.633) percent significance.

## VI. DISCUSSION OF FINDINGS

The findings obtained from data analysis above include:

1. There are should be adequate planning and coordination for construction workers to prevent suffering a bad back from handling heavy materials, suffering hearing loss from loud noise, motor vehicle crashes and falls from height.
2. There is need for government to enact health and safety policy to avert dangers to workers.
3. There is need for the involvement of building professionals team to be on site.
4. There should be for infrastructural facilities such as first aid box and other medical facilities.
5. The protective helmets, gloves, goggles, nose and mouth covers should be provided to avert breathing in asbestos fibres, cement dermatitis, awkward postures, heavy loads, noise, knee trauma, stress, isolation, glue and glue vapour..

The level of fatal injuries among traders on construction sites revealed that masons/bricklayers are most liable to fatal injuries among trade's men on construction site.

## VII.CONCLUSION

This paper confirmed that several construction sites lack basic health and safety requirements which would hinder the productivities of construction worker due to accidents and injuries sustained on site. This significantly affects the performances of site construction workers by reducing the total commitment to the delivery of the project within the schedule cost and time frame. Many factors accounted for this, ranging from factors that affect the health and safety performance of construction workers, fatal injuries among construction workers, level of fatal injuries among traders on construction sites and identification of chemical, physical and other hazards available at the construction work sites.

## VIII. RECOMMENDATION

The following recommendations were put forward to resolve health and safety performance of construction workers on sites with construction works especially in Nigeria.

It was recommended that:

1. The management of construction companies needs to be aware of, and understand safety issues and their importance in order to ensure health and safe working practices to workers.
2. There are should be adequate training and retraining of construction workers to maintain effective health and safety practices, consideration of health, safety and welfare of their workers.
3. There should be government legislation to protect the health, safety and welfare of workers.
4. There is need to engaged the building professional team to monitor the site workers
5. There should be provision for infrastructural facilities before, during and after construction.
6. There are should be adequate communication, planning, coordination and effective monitoring of construction workers to avert the accidents and injuries.

**REFERENCE**


[1]. **Olanrewaju, S.B.O. and Akinpelu, S.O. (2014):** Impact of Building code on Health and Safety of Worker in Construction Industry. *International Journal of Scientific Research and Education, Volume 2, Issue 12, pp.2552-2560.* http://ijsae.in

[2]. **Bamisile, A. (2004):**, "Building Production and Management". Foresight Press Limited, Lagos Nigeria. pp 254-276.

[3]. **Huber M, Knottnerus JA, Green, L., van der Horst H, Jadad AR, Kromhout D, Smid H. BMJ (2011):**343(d4163) http://savenhshomeopathy.org/wp-content/uploads/2012/09/Huber-Definition-Health-BMJ-21.pdf

[4]. **World Health Organization**. *WHO definition of Health*, Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19–22 June 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. In *Grad, Frank P. (2002). "The Preamble of the Constitution of the World Health Organization". Bulletin of the World Health Organization 80 (12): 982.*

[5]. **World Health Organization (2006):** *Constitution of the World Health Organization –Basic Documents*, Forty-fifth edition, Supplement, October 2006.

[6]. **Callahan, D. (1973)***: "The WHO definition of 'health'". The Hastings Center Studies 1(3): 77–87. doi:10.2307/3527467. JSTOR 3527467.*

[7]. **Taylor, S, and Marandi, A. (2008)**: *"How should health be defined?". BMJ 337: a290.doi:10.1136/bmj.a290. PMID 18614520.*

[8]. **Bellieni, C. V. and Buonocore, G. (2009)***: "Pleasing desires or pleasing wishes? A new approach to pain definition". Ethics Med 25 (1).*

[9]. **Charles, G. Oakes, PhD**, Blue Ember Technologies, LLC.*"Safety versus Security in Fire Protection Planning,"*The American Institute of Architects: Knowledge Communities, May 2009. Retrieved on June 22, 2011.

[10]. **Lin, J. and Mills, A. (2001)**: Measuring the health and safety performance. Feartures, 19 (3/4), 131-138.

[11]. **Nishgaki, S. (1994)**: Humanware, Human error and Hiyarihat: a template of unsafe Symtoms, Journal of construction Engineering and management 120(2), 421-441


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