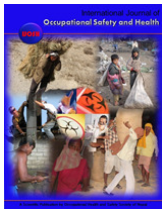

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Original Article

YouTube as a Source of Information on Confined Space Safety.

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Abstract:

Safety professionals looking for information on confined space safety often use the Internet as a resource. YouTube is a popular website that may be used to supplement safety training or as a source of information pertaining to Confined Spaces (CS). YouTube was examined as a source of information on CS safety.

YouTube was queried using key phrases "confined space," "confined space entry," and "confined space rescue." Two safety experts reviewed each video and assigned score for accuracy and view-ability.

Of the 220 videos screened, 48 were found to have relevant information about CS safety and were selected for inclusion in the study. Approximately 70.8% of the videos were rated as inaccurate and 87.5% were rated as offering little value.

Results of our study suggest that YouTube may currently be an inadequate source of information on CS safety. Safety professionals should verify YouTube video content against trusted agencies such as OSHA before using them as a resource for CS information.

Key Words: Confined space, permit –required, YouTube, video, safety, OSHA

Introduction

Many industrial workplaces contain spaces that are considered 'confined' such as valve pits, boilers and silos. A confined space (CS) is defined by the Occupational Safety and Health Administration (OSHA) as any space that is large enough for an employee to enter and perform work, has limited access and has a configuration unsuitable for continuous occupancy. More specifically, OSHA uses the term 'permit-required' CS to describe a CS that contains one of the following characteristics: a hazardous atmosphere; a material with engulfment potential; walls or floors that converge inward or, any other recognized safety or health hazard [1]. Many accidents in CS and permit required CSs are caused by atmospheric hazards, engulfment hazards and equipment hazards [2]. Fatalities in CS and permit required CSs are relatively rare; however, when they do occur, they usually involve multiple deaths because untrained coworkers attempt ill-fated rescues. In fact, more than 60% of CS and permit required CSs fatalities are attributed to such attempts [3]. To keep workers safe in CSs and permit required CSs, OSHA has established specific, regulatory requirements industry must follow that include written plans, space evaluations, permit processes, entry procedures, rescue operations and proper training. Training for CS entry and rescue typically involves in-class lectures, multimedia video presentations and hands-on exercises on the following topics: space hazards, space evaluations, entry permits, personal protective equipment, lock-out tag-out, atmospheric monitoring, ventilation, and personnel roles and responsibilities. The distribution of accurate CS and permit required CSs multimedia on the Internet is becoming an important tool to help industry comply with OSHA regulations and to reinforce proper CS and permit required CS practices.

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YouTube is a freely available, video-sharing website on the internet. Each day over 100 million people view YouTube videos and over 65,000 videos are added to the site [4]. The content on YouTube is not subjected to a peer-review process and anyone with an internet connection may post videos. Within the last 10 years, researchers in several health-related fields have begun to assess the popular internet site as an informational source and many of the studies suggest YouTube may not be reliable. Public health scientists examined 153 YouTube videos related to immunizations and study found that approximately half of the videos did not support immunization and that this information often contradicted reference standards [5]. Dermatology researchers examined 72 YouTube videos related to tanning salons and found that the number of videos advertising salons outnumbered those that discussed the risks of tanning salons [6]. Food safety researchers examined 76 food safety-related videos posted to YouTube and found that a large portion of the information to be only moderately credible [7]. Medical researchers reviewed 54 videos that demonstrated cardiopulmonary resuscitation (CPR) technique and found that while most steps of CPR were fairly-well demonstrated - a number of them demonstrated the steps incorrectly [8]. Cancer researchers assessed 15 videos pertaining to the diagnosis and treatment of prostate cancer and found that 73% of the videos displayed content that was considered mediocre [9]. While many of the studies suggest YouTube videos are not a reliable source of information, a few of the studies found that some of the videos were useful. Urology experts analysed 199 YouTube videos as an informational source on kidney stone disease. Results of the study found that only less than one-quarter of the videos were considered misleading [10]. Disease experts analysed 142 YouTube videos regarding the 2009 H1N1 Influenza pandemic and (similar to the Urology study) and results showed that only less than one-quarter were considered misleading [11]. Due to its popularity and accessibility, YouTube could be considered an important medium for sharing occupational safety information. However, because of this level of access, the potential for spreading inaccurate or misleading information exists. No previous research was found that examined YouTube videos as a source for CS safety information - even though the web site continues to be an important medium for conveying information. This study analyses the source, content and quality of information related to CS information in videos uploaded to YouTube.

Methods

On March 19, 2011 YouTube (www.YouTube.com) was queried using the Key words confined space entry and confined space rescue for videos. Videos found during these queries were reviewed and analysed for content by two independent safety researchers with a combined experience of over 20 years in the occupational-safety field. Use of the English language in the videos was a prerequisite for inclusion. The characteristics upload date, view count and duration were recorded. Videos in multiple-parts were counted as one and the view count for the first part was used in the analysis. Duplicate videos and those used solely for product advertising purposes were excluded. The researchers categorized videos by source into the following six groups: Laypersons (LP), Government Agencies (GA), News Programs (NP), Training Companies (TC), Equipment Suppliers (ES) and Miscellaneous Business (MB). The researchers then analyzed the content of the videos for accuracy and view-ability. Accuracy referred to a video's ability to demonstrate appropriate equipment, procedures, and steps necessary for a proper entry or rescue. Accuracy was rated by the researchers on a scale from 0-8. The ratings were averaged: scores less than four were considered inaccurate and scores greater than four were considered accurate. A score of four was considered neutral. View-ability referred to a video's ability to be clear, portray realism and the amount of detail it provided. The researchers rated view-ability as either satisfactory or unsatisfactory. View-ability was rated by the researchers on a scale from 0-5. The ratings were also averaged: scores between 0-2 were considered unsatisfactory and scores between 3-5 were considered satisfactory. The rating scales were developed based on similar scales from the Murugiah, Vallakati, Rajput, Sood and Challa study [8]. A Kappa-coefficient of agreement with linear weighting was used to determine the level of agreement between the two researchers. Data entry was performed using Excel (Microsoft Corporation, Redmond, WA) and non-parametric statistical analyses were conducted using XLSTAT (Addinsoft, New York, NY). The Mann-Whitney U test was used to evaluate differences between the means of two continuous variables. The Kruskal-Wallace test was used to evaluate differences between the means of two or more continuous variables. The Spearman Rank Correlation Coefficient test was used to evaluate the strength of associations between two continuous variables.

Results

A total of 220 videos were screened and 48 were found to have relevant information about CS safety. The Kappa coefficient of agreement regarding classification of these videos was 0.73. This magnitude of agreement is considered "substantial" [12].

The classification of videos according to accuracy and view-ability, along with details of other characteristics, is given in Table 1. The total duration for all the videos combined was 237 minutes. The mean duration for all of the videos was 4.93 minutes (SD= 3.44, range = 1.0-16.0). The mean number of months all videos were on YouTube at the time of the study was 27.33 (SD= 15.49, range = 1.0-61.0). The mean views for all of the videos was 4,446 (SD=11,926, range=25.0 - 76,029). Twenty nine percent of the videos (SD= 2.89, range = 5.0-8.0) were rated as accurate and 70.8% (SD= 1.83, range = 0.0-2.0) of the videos were rated as inaccurate. Accurate videos were viewed significantly more than inaccurate videos ($p>0.01$). There was a significant, positive correlation between the number of views and the total number of months videos were on YouTube $r(48) = 0.480$, $p<0.0001$. The duration of satisfactory videos was significantly longer than unsatisfactory videos ($p>0.004$); however, there were no significant differences between the durations of accurate and inaccurate videos.

Additional details about the YouTube videos by the various sources are listed in Table 2. Videos uploaded by LP represented the largest proportion in number (41.6%), duration (36.5%) and months on YouTube (46.2%). However, TC videos were viewed more than any other source (51.4%). Accurate TC and GA videos were viewed significantly more than accurate MB videos ($p>0.01$ and $p>0.01$ respectively). Accurate TC and GA videos were also on YouTube significantly longer than accurate MB videos ($p>0.01$ and $p>0.03$ respectively). No other significant differences were observed among accurate videos. A majority of the YouTube videos (88%) were also rated as having unsatisfactory view-ability; however, there were no significant differences in views between satisfactory and unsatisfactory videos.

Discussion

On the date of this analysis (June 3, 2011), YouTube had approximately four hours of video related to CS safety,

Table I Characteristics of YouTube videos with information about confined space safety

Accurate	Inaccurate	Satisfactory	Unsatisfactory	
			View-ability	View-ability
No. of videos (n)(%)	14 .0 (29.2)	34.0 (70.8)	6.0 (12.5)	42.0 (87.5)
Total duration (min.) (%)	128.0 (54.0)	109.0 (46.0)	61.0 (26.0)	176.0 (74.0)
Mean duration (min.) ±SD	6.21± 4.64	4.41± 2.73	10.4± 4.15	4.3± 2.77
Mean no. of months ±SD	34.0 ± 14	24.46 ± 15.26	29.2 ± 21.37	21.37 ± 14.98
Mean rating ±SD (range)	5.29± 2.19 (1-8)	2.3± 1.83 (1-7)	5.17± 1.46 (3-8)	1.18± 1.74 (0-5)
Total views (n)(%)	154,109 (72.2)	59,304 (27.8)	99,130 (46.4)	114,283 (53.6)
Mean views ±SD (range)	11,007 ± 20,419 (37.0-76,029)	1,744 ± 3,539 (25-15,695)	19,653 ± 32,486 (37-76,029)	2,677 ± 5,284 (25-26,745)
Source	GA:6	LP:18	MB:2	LP:20
	LP:3	MB:4	TC:2	GA:9
	MB:2	GA:5	LP:2	ES:5
	TC:2	NP:2		MB:4
	NP:1			NP:2
				TC:1

LP= Laypersons, GA=Government Agencies, NP= News Programs, TC=Training Companies, ES=Equipment Suppliers, MB=Miscellaneous Business

Table I Characteristics of YouTube videos uploaded by various sources

TC	GA	NP	MB	EC	LP
Videos (n)(%)	**4 .0 (8.3)**	**10.0 (20.8)**	**3.0 (6.2)**	**6.0 (12.5)**	**5.0 (10.4)**	**20.0 (41.6)**
Duration (min.)(%)	**32.0 (13.9)**	**61.0 (26.5)**	**5.0 (2.2)**	**25.0 (10.9)**	**23.0 (10.0)**	**84.0 (36.5)**
Mean Duration (min.) ±SD	**9.0 ± 6.4**	**4.6 ± 3.29**	**3.0 ± 1.0**	**4.16 ± 2.78**	**4.6 ± 3.36**	**3.57 ± 2.38**
Months on YouTube (M) ± SD	**42.5 ± 6.24**	**22.9 ± 19.5**	**19.0 ± 13.0**	**19.6 21.6 ± 11.36**	**21.6 ± 8.96**	**32.8 ± 13.8**
Views (n) %	**109,099 (51.4)**	**58,728 (27.6)**	**777 (0.36)**	**1,149 (0.54)**	**12,167 (5.7)**	**30,343 (14.2)**
Views (M) ± SD	**27,274 ±33,424**	**5,336 ± 8,439**	**259± 228**	**208 ± 175.9**	**2,433 ± 4,188**	**47,141 ± 198,288**

LP= Laypersons, GA=Government Agencies, NP= News Programs, TC=Training Companies, ES=Equipment Suppliers, MB=Miscellaneous Business

of which 70.8% were inaccurate and 87.5% had unsatisfactory view-ability. It was notable that none of the institutions like the OSHA or MSHA had any videos related to CS safety. A majority of all the videos were uploaded by LP and may explain the lack of accuracy and view-ability. These individuals may not have received any formal CS education or training and may have posted videos as a blog of their personal experiences in and around confined spaces. The correlation between the number of views and months on YouTube suggests that videos may have received more views simply because they were on the website longer. Even though a majority of the videos were inaccurate, accurate videos were viewed significantly more than inaccurate videos. Accurate videos uploaded by TC had the maximum share of viewership and were also viewed significantly more than accurate MB videos. Viewers may have chosen to watch these videos more because TC videos were considered to be instructional training tools and were professionally developed. Due to the growing popularity of YouTube, this form of media is easily accessible by industries that have CS issues at their facilities. Safety professionals may even be using YouTube clips in their CS training sessions.

Limitations

(1) Non-English-language video clips were excluded.

(2) This study presents only a snapshot of information available on YouTube.

(3) This study was limited to a direct YouTube search and does not account for YouTube videos viewed at other sites which embed or link videos and videos on other safety websites but not YouTube.

Conclusion

Given the lack of accurate information available on YouTube regarding CS safety, it is important for safety professionals to seek other available resources on Internet. Although some videos, especially those developed by TC, may be accurate - YouTube is not a reliable source of information for proper confined space safety regulations, methods and procedures. It is anticipated that with the continued growth of smart phone and tablet use (that allow for mobile viewing of YouTube videos), regulatory agencies such as OSHA and MSHA will develop accurate videos for YouTube that may act as a reliable source for safety professionals.

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