The hazards and occupational safety concerns

Before the turn of the 20th century, Europe experienced the full impact of the Industrial Revolution that began a century earlier. It was a time of great technological advancements and one breakthrough led to another until a chain reaction of events transformed European societies into manufacturing hubs that are able to manufacture products at an incredible pace and shipping out the same in very large quantities. As Europe geared towards industrialization there is one product that has become a crucial ingredient in rapid development and it is none other than steel.

Steel is a product of a complex and deliberate process that transforms iron ore into a metallic material of great strength as well as innumerable uses. Steel is needed to build buildings, factories, equipment found in factories, and transporters like airplanes, ships and trains etc. There was a great deal of demand for steel especially in the Western world during the economic boom and even after the economies of Europe was forced to undergo changes the appetite for steel never faltered.

It is therefore understandable why there is very little impetus to have a thorough analysis of the inherent hazards of steel manufacturing – there is no time to pause. Aside from the great demand for steel there is also the added problem of having very little scientific or medical information regarding the harmful effects of some processes, equipment, and even the substances used to create steel from iron ore.

But a thorough understanding of the risks involved will easily fill up a hundred-page book and there is not enough space here for that level of work. This paper will therefore provide an overview of some of the most

common problems associated with steel manufacturing. The Process Just like any other manufacturing facility there is always a risk involved. For steel manufacturing the inherent danger posed by the smelting of metal ores into saleable materials fit for industrial use is obvious.

If a simple factory – one that is tasked to manufacture and package light materials – can experience accidents how much more will a complicated manufacturing process that involves transforming minerals from ores into something strong enough to withstand pressure and heavy loads. According to the World Business Council for Sustainable Development (“ WBCSD”) iron ore can be smelted in blast furnaces or in direct reduction plants. The WBCSD adds that the process varies but the common pattern begins with the ore crushing phase and then: …. ground to very fine particles (which is quite energy-intensive), and then put through a ange of processes to optimize the separation of valuable minerals from waste …

These processes include gravity separation, flotation, magnetic separation, electrostatic separation, and a range of other pre-treatments, involving an array of chemical processes or reagents. As mentioned earlier a detailed explanation of all the processes involved will require a lengthy discourse. It is therefore the goal of this study to present processes that are readily observable and easily understandable for those who had no prior background to mining or processing of metallic minerals.

High Temperatures One of the more obvious health hazards in the manufacture of steel because high heat is needed to fashion steel from crude iron ores. In this regard, Jeanne Mager pointed out that burns may

occur at many points in the steel-making process and elaborated by saying that this can be due to spills, spatters or eruptions of hot metals. Then aside from burns there is that constant danger of the body overheating while losing precious fluids – a predictable result of working in a very hot environment.

Prevention and mitigation of risks involved proper equipment such as a suit and hood with heat-resistant materials is the obvious choice to solve this problem. But aside from that the management can include heat shields and the installation of proper ventilation. Good management practices should also include adjustments to workload so that workers will have enough time to recover from time spent in the oven-like environment. Chemicals The production of steel does not only involve mechanical or electrical processes and high heat.

There is also the need for chemical processes as well. One of the most common substances used in steel processing is chromium. Joseph LaDou considers chromium as one of the deadliest substance that a steel worker can come in contact with and he remarked, “ The greatest occupational hazard historically has been in chromate production, where exposure to Cr(VI) resulted in high incidence of lung cancer. ” The above-mentioned statement by LaDou does not bode well for steel workers who are also exposed to harmful effects of chromium.

The following are some of the more common effects of prolonged exposure, aside from cancer: a) ulceration; b) bleeding; c) erosion of the nasal septum; d) cough; and e) chromium-induced asthma. Other Substances Aside from

the toxic chemicals that ca readily affect the health of the workers there are other substances present inside the manufacturing plant that can also spell disaster for those who are working in close proximity to said substances. According to Mager, effective management of steel producing facilities must be always on alert with regards to carbon monoxide poisoning.

And the author adds, “ Carbon monoxide sometimes emanates or leaks from the tops or bodies of blast furnaces or form the many gas pipelines inside plants, accidentally causing acute carbon monoxide poisoning. ” Since carbon monoxide is a gas then it also follows that the effective way to mitigate risks is to ensure that proper ventilation is present inside processing plants. It will also help if management will invest in state-of-the-art gas detection devices that will monitor the concentration of harmful gases in the air surrounding the workers.

Aside from gases there are solid particles that pose risks to workers. And example of which is silicon; a black to gray, lustrous, needle-like crystalline solid and is used primarily as an alloying agent as well as a deoxidizer in steel manufacturing. According to Jeffrey Vincoli in his work, Risk Management for Hazardous Chemicals, the following acute but short-term health effects can be expected from prolonged exposure to silicon: • Skin: Irritation and rash; • Eye: Severe irritation and possible inflammation; and • Lung: Irritation of the nose, throat, and lungs, chronic cough, and headache

Since silicon works upon contact then those who are most likely to be repeatedly exposed to the said substance must take care to avoid prolonged contact. Management must also impose a protocol that involves wearing the

proper equipment that will minimize inhalation and contact to eyes and skin. Facility For those who processing steel inside the United Kingdom there is a need to investigate future sites and then when given the go signal to build a steel manufacturing plant, management must be careful to observe all necessary requirements to ensure a safe facility.

The following will explain why the creation of new steel plants requires more vigilance in UK than in other parts of the world. Jack Rostron pointed out the obvious that in UK land is scarce, as compared perhaps to China, Russia and the United States. Rostron then proceeded to explain the implication of this phenomenon: The shortage of ‘ greenfield’ sites for new development and the need to preserve quality land has brought about increased pressure to develop old industrial land for commercial, industrial and domestic use.

Old industrial sites usually retain below their surface the remains and waste residue from previous uses and occupancy. Conclusion There proponent agrees with Jeanne Mager who asserted that steel manufacturing plants are an unforgiving place and that there is a need to have an integrated approach that combines good engineering, maintenance practices, safety procedures, workers training, and effective use of personal protective equipment or PPE. This is the only way to mitigate risks and ensure the safety of all personnel.

On the other hand there is also a need to acknowledge the warnings made by Jack Rostron who made a valuable contribution to the safety of UK’s steel industry when he talked about the unseen dangers lurking beneath sites that were redeveloped to function as steel plants but for a long time was used for other industrial purposes. There is no need to elaborate on this as one can

easily imagine the various chemicals buried below the surface and these harmful substances have nothing to do with steel works. These contaminants must be removed before any serious steel processing can commence.