

Aqueous ozone technology - A new revolution for sustainability in hotel industry

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Abstract:

Hotels consume a lot of energy and water for their day to day operations to keep the customers contented in a clean and hygienic environment. Guest expects high level of cleanliness at all times. Many water conservation practices, timers/sensors, aerated faucets, pressure nozzles etc. have been installed by the hotels for sustainability. A current technology called 'aqueous ozone' would be a solution to many of the cleaning operational processes that consume a lot of water. Aqueous ozone is a powerful oxidizer proven to clean effectively, destroying a swarm of germs, bacteria, and other contaminants on surfaces, which helps to deodorize and sanitize them. A descriptive research was carried out to get information from hotel employees on the consciousness of this technology, its practicability, eco-friendly benefits and cost effectiveness in hotel operations. It has been observed that though the industry has awareness of aqueous ozone technology, the implementation and practicability were in the initial stages restricted only to public areas and laundry. The properties of ozone as air & water purifier and as deodorizer were still to be installed. It is therefore necessary to bring radical reforms by the implementation of aqueous ozone technology for the sustainability of the hotel industry.

Key words: Aqueous ozone technology, Hotel industry, Sustainability

Introduction

Class categorization of the hotel is acknowledged by its score for the hygiene standards it follows throughout all its properties. Hygiene is regarded as a key element when any guest consider of occupying a room in the hotel. The hotels have to take paramount consideration of the matters such as air quality & sanitization which will ensure and endure protection against any possible microbial attack; assuring safe environment to guest as well as employees provide benevolent services in the hotel. Since inception hotel industry has observed many trends directed towards providing a comfortable environment to the guest. The revolutionary contemporary expertise of ozone technology will help hotels in providing safe environment to its guest with a delightful experience.

Guest gives lot of importance to hygiene and cleanliness while selecting hotels for their stay (S. Kannan 2005- Hotel industry in India). In hotels the housekeeping department is responsible for cleanliness, maintenance, aesthetic upkeep of rooms, public areas, back areas and the surroundings.

Hotels major requirement is continuous supply of water and energy for maintaining guest satisfaction. This industry has been fighting against water shortages for decades by hiring private water suppliers who fill the water tank a number of times per day as per the hotel's requirement. Both financially and environmentally it is a heavy burden on the hotel as it reduces the profits. Approx. 80% of waste water is generated daily through the use of various facilities and cleaning processes in the form of grey-water which is treated chemically for further use.

There has been an increasing consciousness of the need to use eco-friendly products, practices and processes among the hotel industry. One of the preferred processes that could not only facilitate save energy but also help in cleaning process without use of chemicals is ozone treatment. It is emerging as a clean and environment-friendly technique that has a wide application in various areas of the hotel industry like housekeeping, kitchen, laundry, swimming pools, water treatment plants etc. as it does not leave any harmful by-products.

Ozone – a new revolution

Ozone is a naturally – occurring colorless, odorless reactive gas created in the atmosphere when sunlight adds an extra oxygen atom to the molecules in the air. Ozone can also be mechanically created i.e. made by one machine.

Properties of ozone can be very favorable to the hotel industry. The hotel industry's goal is to present a very clean, hygienic and sanitized environment to their guests. This requires the utilization of various cleaning agents, equipments and consumption of water and energy. If the properties of ozone are studied carefully it can be a boon to the hotel industry. It would help maintain the quality of air, water and controlled consumption of water and energy, thus, providing a comfortable and clean environment to the guests while maintaining the natural resources.

There are pros and cons of this Ozone technology. The advantages of this technology are that the hotel rooms can be protected against airborne mold, bacteria, viruses, odors and (Volatile Organic compound) VOCs and also as cleaning agent gives better results than water on fabrics. It lowers environmental pollution conserve water and energy protracting the natural resources. It reduces the use of air fresheners and cleaning agents.

There are also commercial benefits of aqueous ozone technology attached to hotel industry like increase in guest satisfaction scores due to improved operational efficiency and in employee's job satisfaction through deployment of user friendly and greener cleaning processes and equipment. This technology would also aid in reduction of the linen replacement cost.

The disadvantages of this technology are that it is not effective on all odors and VOCs and the stains on fabrics have to be pre-treated before the ozone water treatment in laundry.

Review of literature

Kerwin L. Rakness in the book (Ozone in Drinking Water Treatment: Process Design, Operation, and Optimization, 2005) has mentioned that if ozone is controlled and carried within pipes it is beneficial as an oxidant at the drinking water treatment plant, food processing plant and in certain industrial applications.

Oxyzone company on their webpage have focused on the properties of ozone as a non –chemical disinfectant, odor removal and water sanitization. They have also highlighted the areas of ozone use in the hospitality industry. Their product ozone generator is environmental friendly while Silver UV ozone equipment ensures the highest hygiene standard killing bacteria in the air and on working surfaces in the restaurant and kitchen and in a commercial food manufacturing industry.

William D. Frye in the magazine *Lodging* (September 22, 2017) has informed about the benefits of ozone in conserving water and energy in the laundry system. When ozone is introduced in the wash cycle it can help save water, energy, and process time and also minimizes the use of harsh laundry chemicals. Ozone laundry system also includes improved sterilization and safer working conditions because of the minimal use of harmful chemicals. It is also less harsh on the hotel linen, thus improving the life of linen.

The post of Joel Leusink in *Ozone news* (November 12, 2015) discusses on the Imperial Hotel, New Delhi's initiative on using ozone treatment to disinfect and deodorize guest pillows and linen towards providing microbe free linen to the guests, thus allowing guests to enjoy a comfortably rest. This treatment imparts sensation of freshness and cleanliness on the linen. Hotel Imperial has initiated this revolutionary technology to provide absolute guest safety from cross contamination and infection.

In *WQP magazine* (May 5, 2015) an article by General Manager (Holiday Inn Express & Suites in Atascadero, California) Mr. Amar Sohi on Suite savings talks about the guest expectation of clean linen and how ozone technology system helps in keeping linen replacement costs down along with saving of energy and water

The web page of Laundry Consulting discusses on the benefits of ozone laundry. It informs on how switching to an ozone laundry standards considerably reduces the usage of hot water and energy. It also lessens the requirement of freshwater depending on the type and amount of soil loading. These big water savings help earn points required for ecotel certification. Also ozone laundry requires lesser amount of hot water thereby the carbon released in the atmosphere does not contribute to the problem of global warming and thus helps in sustaining the environment.

National Ozone Association in the admin blog (12-08-2012) informs about the need of buying suitable ozone machine as per its use for the hotel. It also specifies the need for skilled labor to handle and maintain the machine as the determining factors for the ozone machine to be effectively beneficial. If ozone is not handled in a safe manner it can bleach carpet, overheat equipment and can be under-utilized. Laurence Franken, M.S. (White Paper, November 2005) in his paper has discussed the application for ozone use in hospitality and travel industry, clean room, food and beverages, and water and waste water treatments. He informs about the use of ozone technique in curbing air pollution which keeps the air quality fresh. Ozone can be used as a disinfectant in food & beverage industry as well as for cleaning in housekeeping department. Ozone can be safely used as food additive as an antimicrobial agent in the treatment, storage, and processing of certain foods. The paper also states the advantages, disadvantages and misconceptions of this technology.

Article in *HOTEL* (Dec-Jan'15) emphasizes on the intricacies of ozone in laundry cleaning process and as a disinfectant. The wash process is enhanced and the overall time of the wash cycle is also reduced. The grey water generated has minimal chemical residue which involves simple water treatment. As the washing can be carried out in cold water it can save energy.

Arvind Kumar Saraswati in his article in *Clean India Journal* (May 1, 2009) has highlighted that the properties of ozone can be used to improve the quality of air and water in hotel rooms and public areas. Room ozonizers and ozonizing air scrubbers are used to absorb bad odors and help in improving air

quality. It is a better option to be used as a cleaning agent and in the cleaning processes followed in hotels being more effective than bleach used to disinfect swimming pool water, thus reducing health hazards.

Objectives:

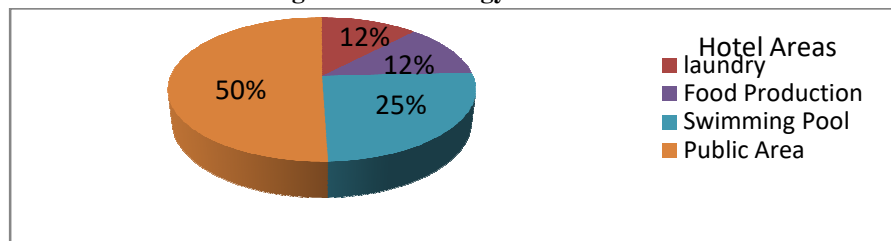
1. To understand ozone properties & awareness of aqueous ozone technology
2. To explore the practicability of aqueous ozone technology in hotel industry.
3. To study the application of aqueous ozone technology for sustainability.

Research Methodology

The study aims to propose the implementation of ozone technology in the various hotel cleaning processes and in maintaining hygiene as guests prefer clean surrounding and are willing to pay the price for the same. This descriptive study will help in finding out whether the hotels in Pune & Mumbai cities are aware of the various uses and impact of ozone technology for the various cleaning operations, in sustaining energy and water resources with a negligible impact on the environment. The cost of equipment and the skills required to handle the same will also enlighten us about the ease of acceptance of this technology in the hotels. A total of 25 five star and four star category hotels were visited, & employees and managers from Pune & Mumbai were interviewed with help of structured questionnaire designed on Likert scale in order to understand their perspective towards this technology. The data analysis on the basis of pie charts and bar charts will help in evaluating the objectives of study.

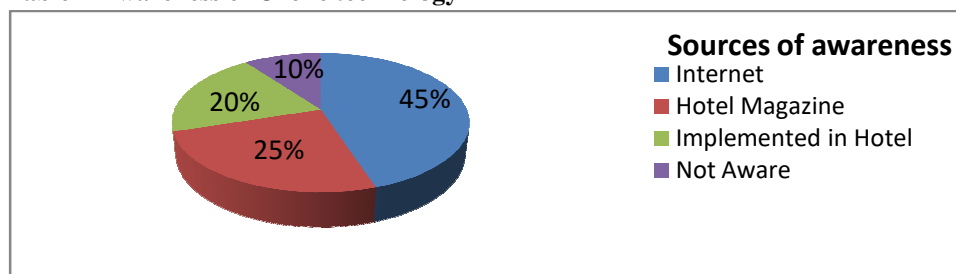
Data analysis and findings

Table 1 Hotels areas using ozone technology



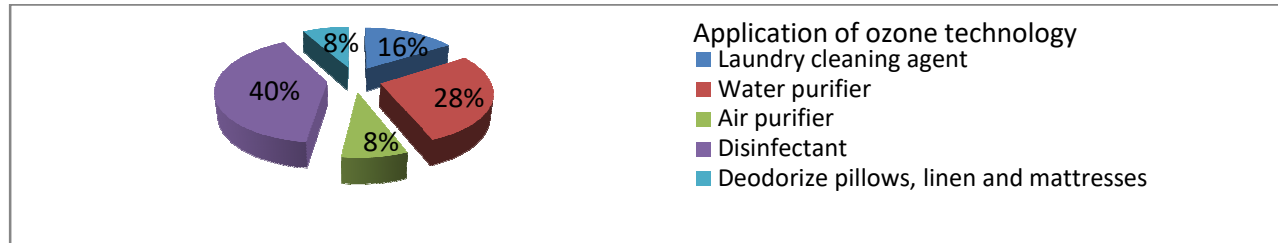
Aqueous ozone technology can be applied in laundry, food production, swimming pool and public areas. About 50% of the hotels have implemented this technology in cleaning operations of the Public area. This is followed by 25% using this technology in the cleaning of the swimming pool. Only 12% have used this technology in laundry and food production

Table 2 Awareness of Ozone technology



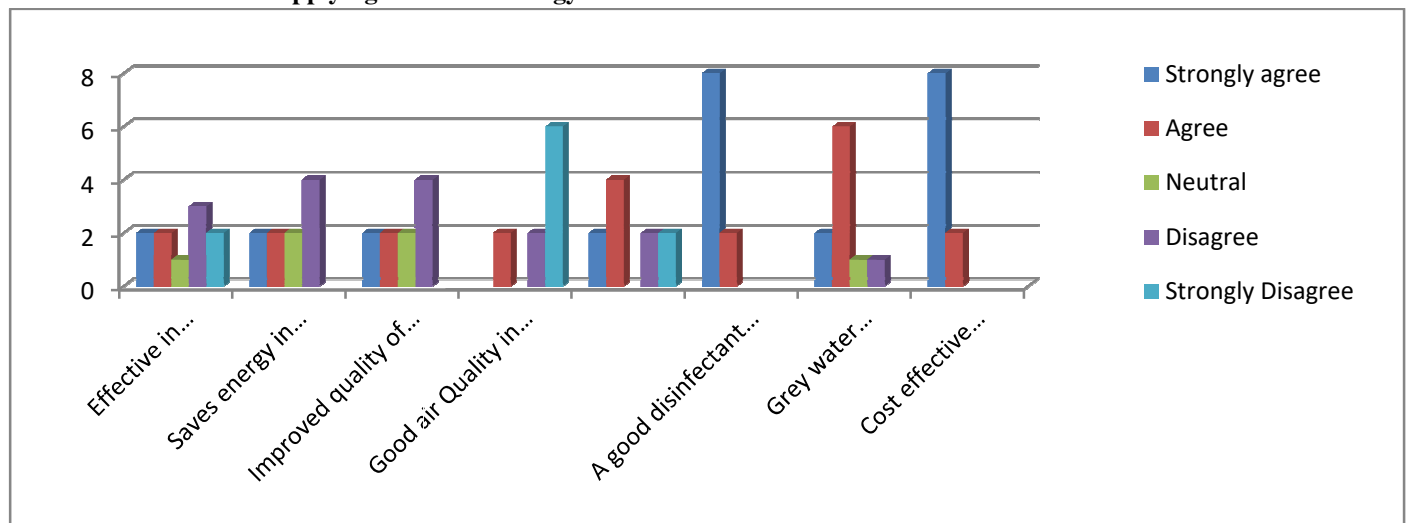
The above pie chart analysis shows that 45 % of the hotel employees are aware of this technology through internet while 25% have also read about it in trade and hotel magazines. 20% of the employees are using the application of ozone technology in their hotels and have seen the impact of the technology as disinfectant and in laundry cleaning procedures. Only 10% were ignorant of the concept.

Table 3 Awareness of application of ozone technology in hotel operations

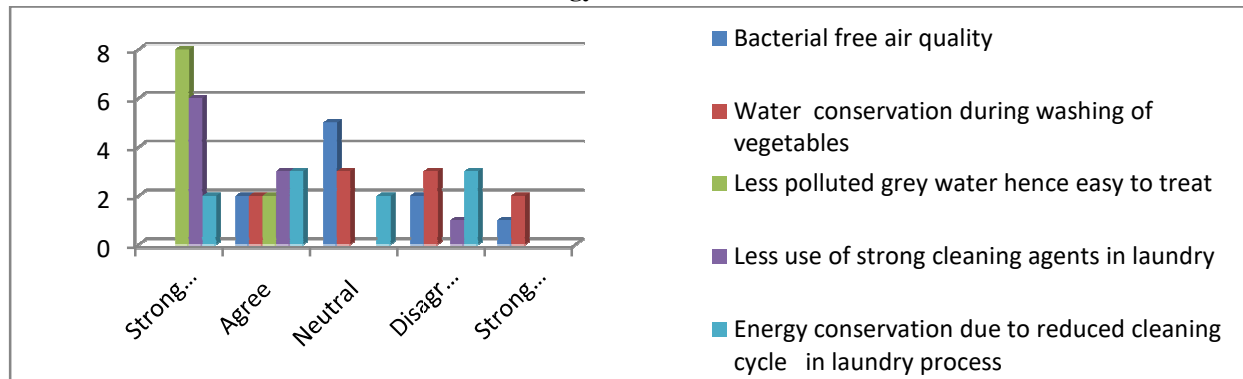


Through the sources of awareness 40% of the hotel employees are sentient that ozone is used as a disinfectant while 28 % have heard of this technology being used in water-purifiers. 16% of the employees are aware of the use of ozone as a laundry cleaning agent. 8% have read in magazines and through internet about the implementation of ozone in air purifiers and in deodorizing pillows, linen and mattresses.

Table 4 Convenience of applying ozone technology in hotel



The above chart shows that employees strongly agree that the ozone technology acts as a good disinfectant for various surfaces and is very cost effective for cleaning operations. Employees have felt that ozone could have an important role in grey water generated with fewer chemicals but at the same time feel that this technology cannot contribute in maintaining of good air quality in rooms and restaurants. Employees have a mixed reaction on the overall effectiveness of ozone technology being used in their hotels.

Table 5 Environmental benefits of ozone technology

The above chart shows that hotel employees strongly agree to the environmental benefits of ozone technology. It is easy to treat less polluted grey water generated by ozone treatment. Employees strongly agreed that the fewer requirement of strong cleaning agents in laundry, helped reducing water pollution. Similarly energy conservation also was observed in cleaning operations of laundry. There were employees who disagreed that ozone technology was environmental friendly in keeping a bacterial free air quality and helped conserving water during washing of vegetables. Few employees were not sure of the environment impact of ozone technology hence neutral in their response to the parameters placed before them.

Conclusions

From the above findings we derive the following conclusions

Internet and Hotel magazine/Trade journal were the sources from which the hotel employees were aware of the ozone properties as a disinfectant, cleaning agent, air purifier etc. in the hotel industry. But 10 % of the employees were totally ignorant of this technological concept.

Some hotels have implemented ozone technology as disinfectant in cleaning public areas and in laundry cleaning procedures and in cleaning operations of swimming pool. They are yet to install this technology in water purification process, vegetable cleaning and in improving indoor air quality.

The aqueous ozone technology would definitely help the hotels to be sustainable, environment friendly & cost effective in the long run. It is the need of the hour to implement such technology that helps in sustainability without compromising on the guest satisfaction.

The employees feel that in the long run the ozone technology will be the most effective technology which will help in the maintaining and up keep of the hotel and at the same time being cost effective. Hotel industry has initiated the implementation area wise of aqueous ozone technology.

The pitfalls of aqueous ozone technology lead to less response of implementation of this technology from the hotel industry.

Recommendations

It is seen from the study that though the employees have a fair knowledge about ozone technology they have not witnessed the implantation of the same in their hotels. Only for certain disinfectant processes in public areas, or in laundry cleaning process this technology has been implemented.

The results seen in the public areas and in the finish of the laundered clothes have raised the expectation of the hotels in implementing this technology for other cleaning operations.

Results of air purifiers and water purifiers are yet to be tested by the hotel industry. Only than the technology can be thought of being implemented.

This technology has a high installation cost but in the long run would be cost effective.

Further directive

This study can be carried out for a larger geographical area to study the acceptance, the implementation and cost effectiveness of aqueous ozone technology in other sectors of hospitality industry.

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