

SIMPOSIO BEHAVIOR-BASED SAFETY (24 GIUGNO 2016)

# Zero injuries: from “do it yourself” to BBS

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## ABSTRACT (ITALIANO)

Climaveneta è un'azienda Leader nei sistemi centralizzati di climatizzazione con sedi produttive in Italia, Cina, India. Con l'obiettivo di tutelare la salute e sicurezza dei propri dipendenti l'azienda negli ultimi anni ha applicato un severo piano di miglioramento delle condizioni tecniche e organizzative, culminato nella certificazione OHSAS 18001. La piena conformità legislativa è condizione necessaria ma non sufficiente per raggiungere l'obiettivo di “zero infortuni”, in quanto non tiene conto del “fattore umano”, ovvero il comportamento dei dipendenti. Il seguente articolo descrive come la sede italiana di Climaveneta abbia avviato un processo per la raccolta capillare dei mancati infortuni e dei comportamenti pericolosi che ha trovato la sua naturale evoluzione in un progetto di B-BS. In particolare illustra pregi e difetti del progetto di gestione dei comportamenti ideato internamente all'azienda (*Sustainable Safety*) e li compara con il processo di B-BS. Si evidenzia come, sebbene i due progetti siano apparentemente scollegati tra loro, l'uno costituisca le fondamenta dell'altro ed entrambi abbiano come fine ultimo il raggiungimento dell'obiettivo “zero infortuni”.

## ABSTRACT (ENGLISH)

Climaveneta is a leading Company in central climate control systems with production sites in Italy, China and India. In recent years, with the aim to enhance the health and safety of its employees, the Company has implemented a strategically stringent plan for improving technical and organisational conditions, achieving the BS OHSAS 18001 certification. Full compliance is an essential but not sufficient condition to reach the “zero injuries” goal, because it does not evaluate the “*human factor*”, such as workers' behaviour. The following article illustrates how the Climaveneta Italian Production sites launched a project for the detailed recording of “near-miss” and unsafe behaviours, which evolved into a B-BS project. Specifically, it describes strengths and weaknesses of “*Sustainable Safety Programme*”, a conceived in-house method, compared with a “*Behaviour-Based Safety programme*”. In the end, although these two projects are apparently unrelated, the first one builds the basis of the other one and both aim to achieve “zero injuries”.

*Keywords: Zero injuries, Compliance, Behavior-Based Safety, Sustainable Safety*

## INTRODUCTION

Climaveneta is a mechanical manufacturer which develops and builds large chillers and heat pumps in their production sites.

In the four Italian plants, the workers assemble various components using manual pneumatic tools (e.g. screwdrivers, rivet guns), or brazing and heaviest material is moved by overhead travelling cranes or forklifts. All the units are powered and tested in specific testing rooms. At the end of the assembling process the units are loaded on the customers' trucks by overhead travelling cranes.

The main safety risks arise from the constant handling of components, for electrical tasks and for the use of high pressure vessels.

In 2008, the Company established an ESH Department coordinating all the Italian plants in the order to reduce all possible causes and sources of personal injury and strengthen the safety and environment compliance with the following long term aims:

- Zero injuries;
- Improvement of main safety impact tools;
- Spreading the Safety Culture throughout the Organisation;
- BS OHSAS 18001 Certification.

## FROM COMPLIANCE TO IMPROVEMENT

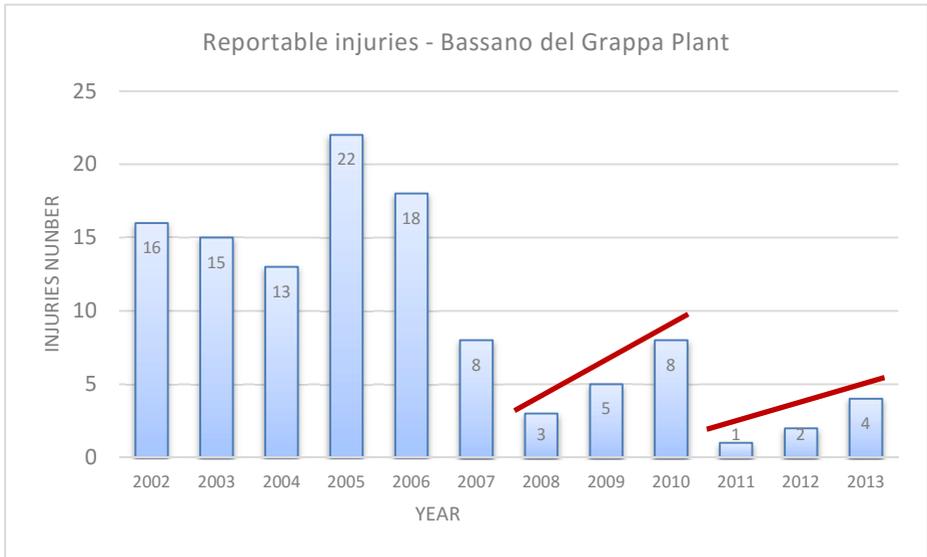
From 2008 to 2013 the Company focused first on compliance and then on improvement activities.

Following are some examples of the Company projects:

- Compliance verification of all tools and machinery;
- Complete revision of the risk assessment (Italian law D.Lgs 81/08);
- Drafting a detailed improvement and maintenance compliance plan based on the "Plan-Do-Check-Act" *lean manufacturing* principle;
- Setting-up a Safety Environment Quality Integrated Management System;
- Safety training plan of approx. 3,000h/man per year;
- Communication project focused on safe work conditions;
- Team Leader training centred on unsafe behaviours.

Figure n°1 describes how in 2008, at the beginning of the abovementioned activities, the number of injuries halved. However, it also shows how the number of injuries grew and later fell following a sawtooth trend.

It shows how a compliance-based plan is effective in significantly reducing injuries, but is not sufficient to reach "zero" level.



**Figure 1** - Number of injuries in Climaveneta Bassano del Grappa Plant.

### **BEHAVIOUR BASED ACTION PLAN**

The Heinrich Pyramid explains that the main cause of injuries is the “human factor”, therefore to reach “zero injuries” it is necessary to record and analyse “*near miss*” and *unsafe behaviour* too.

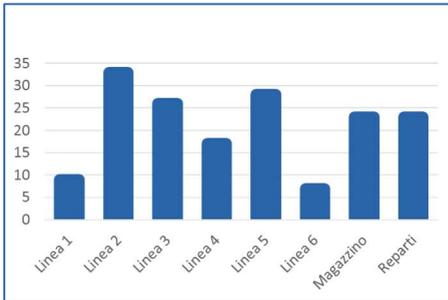
In Climaveneta, since 2010, the Team Leader Training Course has provided a 4 hour session dedicated to the analysis, collection, correction of the unsafe behaviours.

However, from 2010 to 2013 the Company has actually collected less than 10 unsafe behaviour records.

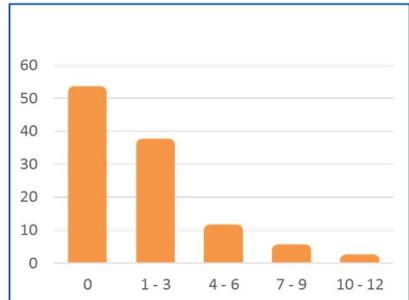
Could these behaviours be identified directly by the workers? Do all the workers take part in this activity?

To answer these questions, in 2013, the ESH Department counted precisely the number of “PDCA form” filled by workers to report improvements in “quality”, “cost” and “safety”.

The following figures highlight a good but not uniform involvement through the assembly lines (Figure n°2) and 50% of the workers have not filled out any “PDCA form” in the last three years (Figure n°3).



**Figure 2** - number of safety reports through assembly lines (2010-2013 years)



**Figure 3** - number of people who filled out safety reports (2010-2013 years)

To involve 100% of workers in this “observing” programme and to increase the unsafe-behaviour recording 10-fold, the Plant Manager and the ESH Dept. created the “*Sustainable Safety Programme*”.

This project is based on the following rules:

- Every 30 days a worker becomes an observer;
- He/ She supports the Team Leader in observing unsafe-behaviours, dangerous situations, near miss and organisational critical issues;
- They record the data on a board located on the start of the assembly line;
- The data are visible to all workers;
- Every Monday the Team Leaders meet the Plant Manager and ESH Dept. to discuss the observations data and decide future actions;
- The next day each Team Leader shows to the other workers the reports of all the boards and *invites* them to adopt *safer behaviour*.

In the middle of 2015, the “Sustainable Safety Programme” reached its targets:

- 75% workers involved as “observers”
- N° 120 unsafe behaviours recorded per year

However, at the end of 2014 the Company recorded n°1 injury and at the beginning of 2015 n°2 (in all cases the accidents were minor).

Analysing these data, the ESH Dept. sees how the “*Sustainable Safety Programme*” involved the workers in an effective way and they know the difference between a safe and unsafe behaviour but the method

- Is not structured to lead the workers to a behaviour change;
- Does not define and therefore warn workers of the risks of certain unpredictable behaviours which while apparently safe, may potentially have severe consequences (e.g. electrical risks)

**BEHAVIOUR-BASED SAFETY**

Based on the above, in the 2015 first quarter, the Company decided to evolve the “Sustainable Safety Programme” into the “Behaviour-Based Safety Programme”.

In the following table, we compare these methods’ features.

Sustainable Safety	Behaviour-Based Safety
<b>Observation method</b>	
<p><b>Subjective</b> What the observer writes on the board depends on the training and on the willingness to point out the unsafe behaviour of his/ her coworkers.</p> <p><b>Partial view</b> The observer records only the unsafe behaviours he/she sees, but he/she doesn’t know if he/she has really seen all the possible dangerous behaviours.</p> <p><b>Facts &amp; Figures:</b> n°120 records of unsafe behaviour per year. A pure number</p>	<p><b>Objective</b> The observer fills in a check-list which reports a variety of behaviours chosen from the pinpointing and the historical database of near miss, injuries and unsafe behaviour.</p> <p><b>Full view</b> The observer records both safe and unsafe behaviours and he/she fills in n°3 check-lists a week.</p> <p><b>Facts &amp; Figures:</b> 11,265 records of behaviours in 6 months. For each of them we know the percentage of unsafe or safe behaviours.</p>
<b>How the behaviour changes</b>	
<p><b>With Antecedents</b> The observers have no training about giving consequences. Sometimes they give antecedents, but they do not follow a specific rule.</p>	<p><b>With Antecedents and Consequences</b> All workers follow a B-BS training course and the observers follow specific training on positive feedback and extinction.</p>
<b>Effectiveness measures</b>	
<p><b>Weak</b>  The board is empty The observer writes nothing because he/she says there are no dangerous behaviours to see.</p>	<p><b>Strong</b>  Trend measure For each behaviour there is a trend measure. (see e.g. picture n°4 )</p>



**Figure 4** – Behaviour trend “use ear protection” in assembly lines 1-2-3 (100% means safe use.)

## CONCLUSIONS

*Compliance:* in order to achieve “zero injuries”, law compliance is an essential but not sufficient condition.

*Encourage “near miss” reporting:* the Team Leaders’ training plan and the “Sustainable Safety Programme” created the necessary awareness so all the workers know the importance of the unsafe behaviours and that the “zero injuries goal” is reachable.

The data were very useful in the pinpointing phase, prior to the B-BS check-list drafting.

*Correct Focus:* although the Heinrich Pyramid underlines the importance of a very extensive unsafe behaviour collection, the Company needs to focus on the safe behaviour increase.

*Feedback:* the best way to reach “zero injuries” is for the Company to use *Positive Reinforcement* for the safe behaviour and *Extinction* to eliminate the unsafe behaviour.

In this way the Company will create a positive and safe work environment.

## AUTHORS



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After completing his studies in Chemical Engineering, he started working in a Chemical Plant where he gained significant experience in industrial safety. In 1999, he joined Riello Spa (a floor standing boiler manufacturer) as Quality, Environment, Safety and Health Manager where he improved his management skills and started to use the Six Sigma methods to solve quality and safety issues. In 2008, he joined Climaveneta Spa as Environment, Safety and Health Manager of all Italian Plants.

He created the necessary conditions for the achievement of the ISO 14001:2009 “Environmental Certification” and the BS OHSAS 18001:2007 “Safety Certification”. He promotes the B-BS programme to create the cultural change needed to drive the organisation toward a safe working environment without injuries.



**Cristina Lionetti.** ESH Specialist at CLIMAVENETA, a Group Company of Mitsubishi Electric.

She graduated in 2010 from the Politecnico of Turin with a Master’s Degree in Environmental Engineering and she became a licensed Engineer in 2011. Since 2011 she has worked in the Climaveneta Environment Safety and Health Department, providing services at four Italian plants. Starting from 2015, she has actively participated in the design and implementation of the B-BS process in the Bassano del Grappa (VI) and Alpagò (BL) Production Sites