THE ATTITUDES OF CONSTRUCTION WORKERS IN THE PRESENCE OF THE PREVENTION OF LABOR RISKS: A CASE STUDY

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**Abstract**

Considering the premise “the main causes of the labor accidents are not the physical conditions of the work environment, are the unsafe acts of the workers”. A revision of the construction works in AGBAR Tower in Barcelona city allowed verifying the necessity to apply the theory based on the human behaviors to improve the Prevention of Labor Risks.

In this study we emphasize in two important elements that guide the behaviors:

- Precedents
- Consequences.

**Keywords:** Prevention, Attitudes, Consequences.

**1. Introduction**

This paper is the result of a field study in a construction building, where were observed and analysed the attitudes that workers carried out front the risk prevention measures established in the company. For this purpose was required: visits to the work’s site, participation in meetings with the risks prevention Committee and prevention technicians.

This study is a very special situation due to the AGBAR Tower project (*Figure 1*) will represent an attractive building for the city of Barcelona, Spain; as a result the eyes and attention of the population, politicians, entrepreneurs and visitors are placed in it. Therefore, the measures that be taken regarding the prevention of occupational hazards, will reflect the state and degree of implementation of appropriate measures of prevention of occupational hazards, and particular way intervention plans behavioural analysis. The building construction also shows great expectations was carried out by one of Spanish companies more large, assumes this accustomed to the great challenges and to make them respecting all the rules required, between them of prevention.
Objectives

- To make a direct review and an analysis of the works of AGBAR Tower regarding the implementation of the risk prevention plan.
- To show that many ideas are not the conditions of the place the main cause of accidents, but workers are themselves and therefore need behavioral analysis tools.
- To do objective the need to incorporate at prevention plan the behavioral analysis tools and thus improve safety.

Methodology

For this work, the methodology followed was essentially qualitative. The research starts from the premise: "workers' behaviors are the main cause of accidents at work", hence that always insist to incorporate the prevention plans the behavioral analysis approach.
2. The insecure workers action as primary causes of the accidents

The experimental study of human behavior applied to the prevention of occupational hazards is very useful, since analysis of the employees conduct provides valuable information that allows find alternative solutions to the purely technical and thereby combating the occupational accidents.

The above is based on that research have presented convincing evidence for the role plays the acts of the persons as direct causes of accidents at work. Of the different studies undertaken by Heinrich already half a century ago, others authors have expanded their findings and confirmed its findings. Thus were reaching more relevant studies aimed directly at accidents the DuPont company, whose conclusions was attributed nearly 80 % of the causes of accidents to insecure persons acts.

Then, "evidence suggests that, in opposed to fairly widespread beliefs, are not the physical conditions of the work environment the main causes of accidents".

Defining the behavioural security as the application to the industrial safety principles and methods derived of the analysis of behavior; this principle includes the performance implications of using conduct by the feedback and positive strengthening to increase behaviour appropriate and corrective to reduce behaviour not desired.

Behavioural security also implies, at least other two elements:

- a) To resist the antecedents that move to the individual to act without prevention
- b) Promote a climate conducive to the culture of company prevention.

The modern theory of safe conduct learning recommended to change first unsafe behaviors related with the theories, promote positive consequences as a result create attitudes positive maintained over time and shared by the environment, may lead to a more stable culture of security.

In the daily worker relationship with its environment of work, this becomes a fundamental element of the behavior, enabling learning behaviour, especially by processes of learning and imitation. If in the Dragados construction company There is a culture of prevention actually assumed and consolidated by all its workers, the problem of the possibility and even the attitude of the workers of outsourced so objectively manifest serious non.

Unfortunately, we don't initiate from a culture of prevention and security (assumed and consolidated), so the behaviour will be learned spontaneously and usually will tend to be insecure. To establish a culture of prevention, we must begin by change behaviors to positively influence the attitudes and them from reaching the culture of security.

In this study, the interventions based on behavioural approach focusing on direct modification of the conduct of interest (preventive and/or risk) and in the investigation of the effects of techniques and intervention in the natural scenery packages (i.e. in the) (company). Behavioural approach enables understood as the conduct of risk in people is maintained through natural reinforcements presented immediately after from being executed.

2.1 Detection of unsafe behaviour

From above, we can deduce that the challenge for effective behaviour intervention in the field of security occupational is to identify the risk conduct, both which has caused accidents such as
those that have not done so, and later modify the set of natural and established contingencies that keep your occurrence.

The information that has been used considers the accidents that are visible, that is reported and registered. The behaviors that of fortuitous way they cause only incident, without arriving at the level of accidents are not included. Therefore it is that all the conducts of risk are not considered. This situation can be represented with the figure of iceberg partially submerged in water (Figure 2) where it is possible to be appreciated that the zone that is located within the water hides numerous behaviors of risk and unfortunately single it is had been attacking what this in the surface outside the water (risk behaviors that finish in accidents). For that reason, one of the main targets will have to be to detect all those conducts that represent some type of accident risk.

In agreement with the sample consulted in the work site, the reports do not contain information of worker conduct, nor its antecedents; single they consider data on the consequences. This way, an aspect to improve is the writing of information so that the data surpass the simple statistic.

This information will allow valuing the frequency and the gravity of the different types from accidents in the observed cases. The frequency is a fairly reliable data that is taken into account in the selection of conducts to observe, whereas the gravity this conditional by the circumstances and surroundings. In general, the consequences are not the same ones when somebody strikes the hand on the ground level that on stairs. Also depending on the height to which is the worker; a slip could be mortal or an incident without consequences.

By characteristics and conditions of places work in the construction sector, falls and bumps are a risk true, always latent variable consequences depending on the circumstances and the same applies to the handling of loads.
Bad habits and excess of confidence in the behaviors that lead to such accidents are the same in cases of no accident, mild to fatal accident.

2.2 Analysis of attitudes in the work site

In our analysis of attitudes in the work of construction sector, we assume the observation of the performance of workers, technicians in prevention provided information on the same performances of workers in charge and commissions in prevention to inquire about the background and the consequences it.

History and consequences are the cause of the form of workers, the background action moved to act in a somehow, then the consequences reinforce integration thus of performance in each of the workers behaviour.

Unsafe behaviour is due to a background and are consolidates from its positive consequences and the absence of significant negative consequences (according to points of workers appreciation).

To change behaviour must be first attack the risk, while proceedings must work to try to change the background and implications that encourage such conduct.

Exits directs and indirects antecedent, where:

- Directs, those are the preconceptions of the individual about the advantages of conduct insecure; and
- Indirects, those are derived from the expectations on the reactions of the environment before it.

It is recognized without letting pass through stop that the sector of the construction is by its natural terrain features the industrial activity of greater labor risks and is where the greater number of accidents is had (Figures 3 and 4).

Figure 3: exterior wall of concrete
2.3 Background observed in the study

As background obtained in our study in one of the works by the Dragados company in the city of Barcelona, Spain. We can draw the following demonstrations on beliefs of the workers who claim not respecting the rules on prevention of occupational hazards:

- Saving time, or at least they believe it
- Are more effective because they work in his
- They feel more comfortable
- They take advantage of better its experience and skills
- Make most work, are better valued by their direct controls and earn more money
- If they fulfill its task, they are never going to throw to them of the work, although they do not respect the prevention measures
- The serious accident must to the bad luck and it is not in direct relation with the prevention measures
- The collective protections make difficult the accomplishment of certain tasks
- Technicians security are only to reproach and punish
Always worked well and nothing has gone them, they are very skilled and not run danger
If they reaching occur somewhat bad serious always blame the company
His boss all you want is to perform the work "well and fast"
His boss not gets involved in issues of prevention of labour risks
His boss will defend them against sanctions
To the company the only thing that interests to him is the productivity
The subcontract it will defend to them and in no case he is going to them to throw
The security technicians are not companions of the work, to them does not matter to them to fulfill the objective of the productivity; and single they are for harassing
The training in risks prevention single is a lost one of time and in addition nobody pays to them
The meetings with the commissions of occupational risk prevention are only one waste of time
This list may still increase since the workers for risk prevention issues put all kinds of pretexts, each of them is justified and gives the reason his companions that to the just like the infringe with security regulations. Before these circumstances, seems to be the respect and carry out their activities securely serious as going against the "System" (that they themselves have settled down and carried out during many years).
Unfortunately his direct experience reinforces many of these convictions and confirmation of the background is added to it indirect due to the attitude of his superiors and colleagues that also reinforce your bad behaviour.
During our observations we have obtained information on the following facts and beliefs that confirm and strengthen background indirect negative.
The direct superiors congratulate in time by a made work (although it has been executed of insecure form)
The direct heads publicly defending workers who take no action security, excuse them or justify them and including occasionally glorifying them
The managers only concern are notorious or at least give it higher priority the economy of the work and meet the deadlines run
The executives still believe that the prevention of occupational hazards is expensive
The entrepreneurs show weakness when it comes to punishing workers running their insecure tasks (that are to be the most productive)
The companions value and respect but the workers who are bold (therefore but the uncertain ones), although they put them in risk

2.4 Analysis model of antecedent and consequence
Once observed that direct and indirect background in workers, which lead to perform unsafe behaviors in the work, we believe that they should be attacked, both those who are really certain as those who are simply unfounded beliefs. The certain should be corrected and the unfounded shall be placed on evidence through training and communication.
These antecedents lead to unsafe behaviour, and it is be incorporated into the worker to become a habit due to the consequences. These consequences are the perceptions of workers on representing the insecure performance advantage. The consequences are which reinforce the background because confirmed them. The worker value, not the fact that could have had an accident, if that has not confirmed their "bad track record" (WINS time, work more comfortable,) (etc.); thus reinforcing still more their unsafe behaviors.

This assessment that workers do on their own unsafe acts is based on three aspects:

a. **The opportunity** ¿what immediate - long-term? If the effect of the conduct of insecure type will immediately or in the long run.

b. **The probability** ¿high - low? Means that if the effect is sure to happen or is relatively unlikely.

c. **The meaning** ¿positive - negative? If the effect of unsafe behaviour is perceived as beneficial or negative.

By incredible appear, for most of the workers are more crucial and decisive save situations time and do things with comfort (direct, immediate and secure consequences, perceived as positive) that work in safety.

### 2.5 Criteria of performance on the antecedents and consequences

We begin by mentioning that the powerful consequences are those which make the worker does not want to use the computer protection, and the most curious of the situation is that in many instances the consequences are the most small, but as inmediatas-seguras and positive end up being that dominate the situation, namely that decide the future behavior of the worker.

The less powerful negative consequences are those which even the most serious and even if they may occur in the long run, nor is secure your presence, that is if such a worker not used the helmet (and correctly), does not mean that immediately will undergo an accident, is most probably never suffer an accident. Therefore the worker assumes the risk that represents not using your computer of individual protection and continues to believe that their actions are correct.

Thus becomes clear that the training and information on the consequences of accidents are ineffective if alone and in case of having it does not remain in the long run.

In most of the time, **implications encourage the act risk**, not happen accidents are confirmed history of the workers.

As naturally not perceive the advantages of the safe conduct or disadvantages of insecure acting, "**need act to make visible the positive consequences of safe conduct and the negative unsafe behaviour**".

Here is where the term **feedback** intervenes, since it must be possible encourage the risk acts.

For the purposes of safe conduct, strengthening the result will be represented by the feedback and care must be taken to ensure that this is early, safe and positive.

An example of positive consequences observed also with the work which refused to use lenses protection, workers arguing that it is annoying to take them during the day of work because it is resbalan them, because hinder them, because with the powder of the environment dirtied soon or because be tarnished them with her own breathing and certainly thereby decreases highly its visibility.
Of course that "with so many reasons" worker will act the same way (insecure). If the fact to wear the lenses does not contribute appreciable negative consequences at first sight, even though knowledge of possible injuries like consequences is had, will not lead to the adoption of safe conducts.

Above, we can ensure that "any occupational risk prevention program will prove to be ineffective while it depends on the background that rarely predict consequences".

Whereas then, if the consequences are those determine and control behaviors, to change these are risk by some type-safe, you need to change the background and its consequences if involve safer behaviors.

In this way, we will continue to insist that the consequences immediate-ciertas and positive must be attacked by the negative reinforcement (progressive punishment, rejection of the environment, disapproval by) (part of same companions and the direct heads) and providing positive reinforcement to correct performances, valuing mainly the actions that are carried out safely, recognizing when working with preventive measures. That has consequences of uncertain and negative kind (not only the serious, but it also those which without) take severity for the physical integrity of workers, cause (disorder to your computer, your family or in-house) these should be patent through training and bells which have strengthened the credibility the company, and transmit their culture by prevention. Therefore these bells are accompanied by facts and visible gestures (mainly the support from managers) showing that there is concern real and are also determined to act in a manner determined in favour of the prevention of occupational hazards.

The indirect consequences that expresses in the proceedings of the environment such as managers, technicians and committees of security must be certain, operational and communicated and also of involve the commitment of all involved.

3. Executive action

We have observed that with regard to executive action in risk prevention almost exclusively responsibility on prevention technicians and that the issue of the prevention of risks labour only is mentioned specifically in meetings for this purpose (with commissions) and not in meetings with senior management.

Then analyses the performance highlighting the aspects that we believe require attention to be able to enter the improve the modification of the background and implications of the actions workers.

3.1 Prevention technicians

On technicians in prevention company, we can assert that they are magnificent observers, that his technical training is outstanding and who are actually involved in the improvement of prevention. However, the application of their knowledge to the context of the work conditioned by:

- The specific conditions of the construction works
- The background and performance of other workers on the construction site
- Deficiency of direct authority
- Absence involvement of staff work

"Selected Proceedings from the 13th International Congress on Project Engineering".
(Badajoz, July 2009)
Asuncion exclusive features monitoring
Executive dependency of work staff
Real authority limited by the structure organizational.

If the conditions of construction activities do difficult the strict application of the rules of prevention, the performance of the technicians is compounded by their lack of independence and executive capacity, by that rely on the cooperation of staff work to his performance not limited to the establishment of measures and personal monitoring of the same.

On the technical side we repeat our perception of excellence in training personnel in prevention, means of individual and collective protection regulations, the best solutions for the worker "knows and can" work safely they are guaranteed by the technicians of the company.

It is also mentioned that the availability and perfect conditions of individual protection equipment, correct placement and good status of collective protections, sessions of training, the documentation on legislation, the prejudices, Committee meetings etc., cared for and are satisfied.

So just missing action that would make it possible to workers act safely and to help that wish to do so and acquire the habit of doing so. Since you cannot expect to existing Prevention of labour risks with simply provide the conditions for the same.

Requires an approach focused on the performance of the worker, in changing behaviours and attitudes, which certainly entailing changes in background and implications of the unsafe action.

Technicians take refuge in the technique, in compliance with the rules and monitoring which are powerless and without support and real collaboration to try to modify the behavioral issues. Like this your only option is to seek to convince the staff of the work of that "collaborate", and do and try to each of the meetings of prevention in the calling you to fix incorrect actions observed.

At each meeting we hear the same responses: "I can not be watching all the time and I say already and they already know, not need training, they know perfectly do well ".

Is the prevention technician who in a personal work and direct checks again and again as the problems were requested correct, only partly correct or simply do case; and the next meeting become exposed earlier problems (which by) (of course still present), these situations are repeated until the accident as announced, is present. Measures are then taken strictly in that affects the case happened until you effect diminishes and left in oblivion, then return to already customary practices.

3.2 On the meetings of the commissions in prevention

Meetings of the committees coordinated and led by the technical prevention are we understand the appropriate bodies for the analysis of performances, antecedents and consequences, and also for arbitrate performance measures.

So its components must represent all the agents (from the lowest level until managers), must be involved and have continuity. Meetings must be operational and its conclusions, decisions and agreements reported to other workers.

Prevention technicians must guide observations, detect and define problems and direct analysis of causes. Meetings Prevention become important indirect consequences must be an effect on the performance of workers (in fact that must be the) (purpose), otherwise, their little
or no impact on the worker is not. It will do more than reinforce the background justifying unsafe action.

Meetings should be a compromise and reflect culture Prevention of the company. Participation continued and involvement all agents Clara is indispensable.

Meetings of prevention must display the tracking of the measures taken, analyse problems and set new objectives, assigning responsible for implementing the measures and track.

At meetings of prevention is to scan the real problems and their causes, and planning action to be able to attack the history and consequences of unsafe behaviour analyzed.

Communication worker to the and with the worker is indispensable, compulsory measures has one imposition reasoned, care calls must be immediate and attitude positive recognized and valued explicitly.

The play command line is the ascendant and authority and the only positive reinforcement will be effective if some of them and be accompanied by the necessary credibility gained through preaching with the example and set background conducive to the culture of prevention. The more effective communication will visibly or will build on work commanders endorsed by them.

4. Considerations for the elaboration of action plan

The plan of action regarding the worker refers must set actions to attack the above-mentioned background and have consequences for the safe performance.

In this regard, we note that the action acting that is being performed attacks especially the area of the consequences through timely negative reinforcement in charge only of technicians of security, who serve only unsafe behaviour directly observed in his visits to the pit.

From his remarks, raised in the Committee of Prevention observed problems and call the compliance corresponding, urging commanders of work which enforce it.

In any case we have been fortunate to observe that is consider the background to take action.

4.1 General considerations

Direct managers share certain background and his attitude and behavior makes visible the worker with which reinforces their convictions.

Direct managers must assume prevention as own making use of its parent and authority acting responsibility in this respect and support technicians security actions.

During visits to the work we also observed cases blatant falsehood on action in prevention of Heads team who claimed that everything was perfect, at the same time as is noted otherwise in their workers. You could also see as some workers provide information on unsafe actions. Making seem as if there is a species of slogan that the worker has complaining exclusively their equipment protection (as if you are uncomfortable) (if clothing, etc.) But if they talk about unsafe actions annoy the team leader. This same happens in the majority of companies When an accident occurs, try to hide to as place the information on this.

It is vital to modify the background negatives of the team leaders for which the credibility of the most senior the company in preventing priority defending is indispensable. For This not only simply declare its importance in speeches, they are necessary gestures and actions visible and communicated.
The image which they have of the interests of the company also works like negative antecedent. Of equal way and for common aims, the performance of the company must notice in the valuation of the work done surely.

Vision of enterprise culture must improve by making it more visible as possible the serious and efficient performance of prevention committees properly driven prevention technicians.

For same purpose, the participation of the staff of the work and managers is fundamental to give credibility to the meetings, only Thus you may expect reach the goal it is to have security works and Therefore reducing the number of accidents.

Prevention technicians must overcome its image and function be simple vigilant and repressive, guiding the analysis of problems and the decision-making so that staff work I acted accordingly, but who? paying the rattlesnake cat?, without doubt, staff of work, the employer and the direct boss (which today says that you can not be watching) must make use of its authority for enforcing the rules and follow the signs of the technical security.

4.2 On training in occupational risk prevention

Training that currently have the workers in many cases reinforces the negative background of the worker.

Training and information that serves this case has of be brief, direct and motivating. Mandatory as it imparts training is in most cases inefficient, when it is not trigger of negative attitudes.

When the information is "transmitted" turns out to be of type textual and exhaustive, in most cases is neither even read, so never doubt and much less is queried with those responsible. Connection information can be effective if it performs using posters placed visibly in places relevant and not simply put all the entry of the work.

You have the technical documentation of prevention with regard to actual cases and especially photographs represent material that it could give rise to growing didactic units for identification and screening of workers, would also be of useful as an argument for the change of attitude of staff work. Of Similarly it would be useful if you have documentation on correct actions.

4.3 Establishment of new background

History implicitly shared by workers, team leaders, heads of work and supposedly by the company, and beliefs such as:

- The prevention only loses time
- The prevention is expensive and is not cost-effective
- There is that reward efficiency, understood as productivity

require action to demonstrate that the working with security can be made at reasonable time when conditions fit to make it possible.

These records should be replaced with:

- A “capable” worker is one that working with security makes the work with quality and within, not one that works risky but is not accidenta for his ability
• The deadlines and costs have established considering investment in prevention and the times that this requires, and here is where customers should be aware of this situation and not impose construction firms times limited

• The subcontractors have set term and cost including warranty application of the rules of prevention, in no case can be reduced the cost or time sacrificing prevention

• "Breach" the rules of prevention should also be considered as a "breach" the contract at the same level as the "breaches" within and quality

• The means will be available, accessible, and perfect conditions for use correct and immediate to all and each worker even for the of subcontractors

• The worker may not have access to work if you fail to comply with the requirements of Prevention

• The responsible worker for the care of the means available to

• All activity must be programmed and evaluated whereas the correct application of prevention measures

• The workers must be trained on the job well done (complying with all preventive measures required) to perform its task with efficacy and safety

• The protective equipment should be used, even in the absence of risk (e.g. when it is the time for food, and are within the work), to get little just become habit

• In any case should reward a job if unchecked that he has been following standards

• The team leaders are responsible not only for what does the worker but how it does. Team leaders have of correct and report unsafe actions

• The prevention technicians should establish conditions and have media to prevention, assist the team leaders and workers for facilitate working with security, also should monitor the implementation of the rules and act according to their powers to compel compliance

• Should observed and rewarding job well done. Team leaders and the security technicians have to certify that the work has been prevention standards

• The company must achieve credibility by making visible measures and acting strongly.

5. Conclusions

The data obtained from our study confirm the negative attitudes of workers regarding prevention and also confirm that unsafe action is not mainly due to the lack of media or to non-action by enterprises, nor by the lack of training or knowledge workers, but mainly by arropada irresponsible and unconscious worker's action by the permissiveness or indifference and in some cases with the complicity of the environment immediate.

We established the transigencia's work is washing his hands in prevention leaving this unique feature of prevention technicians which bear the weight of the surveillance and law enforcement unsafe conduct.
Regarding a topic which is crucial for the implementation of a risk prevention plan based on behaviors, is the assessment and behaviours of workers is strengthening at the same time his actions, and that unfortunately not present still in the works of great importance, therefore, not be presented in other works.

The only effective and lasting performance requires a systemic approach consider responsibility of all actors and set a model of responsible and shared action for the fulfilment of the preventive measures.

And finally we must point out that evidence have sufficient to justify the intervention of the method of prevention of occupational hazards based on behavioral analysis.

6. References


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