2. THE COMPANY (ACCÉS VERTICAL S.L.)

2.1 Presentation

Accés Vertical S.L is a familiar company. Are born the year 2005 to give solutions to the projects in environments of difficult access. It is formed by professionals of the different areas of the construction with a common feeling for the climbing and the sports of risk. During the last years, the company has grown with new workers and continuous innovation. With this idea, they were created *Accés Seguretat Vertical*, a formation center accredited by *ANETVA* (Asociación Nacional de Empresas de Trabajos Verticales). This center does different types of classes and monographies of vertical works and work risks prevention, for the own workers and interested companies. At present, these installations are next to the *Acces Vertical S.L* offices in a building of the Cobalt Street of L'Hospitalet de Llobregat.

Ilustration 1: Accés Vertical S.L location
Source: Google Maps

Ilustration 2: New training facilities.
Source: Own

This expansion to a new headquarters has been possible of the work that they have done the last years. This work has converted *Accés Vertical S.L* in one of the reference construction companies of the vertical works and the height safety systems.

2.2 Organization

The company workers are building engineers, senior training technicians of work risks and technicians of height and vertical works. To manage the company there are management and administrative professionals.

The company does not have many people in staff. At the office, eight workers manage the different areas of the company.

Administration and Finances Area:

This area has different functions. It coordinates all the activities that the company does about the security and health of the own workers. Manage all the necessary administrative documentation to do each work and control the revenue, expenses, investments, etc.

Sales, Marketing and Advertising Area:

It commissions to cater to the company of the necessary material and services to develop the daily activity normally. In addition, advertise the different services that offers the own company for capture new customers and can realise new works to achieve profits. Manage the brand image to internet and to the different social networks or platforms to can reach many potential customers.

Technical Area:

It is the area to talk with the customers, identify the works to do, calculate the economic estimations, schedule the execution, develop projects and reports, do budgets, draw graphic documentation and speak with the different head of work for the job to run well.

Post-Sales Area:

Develop the work memories of the installations carried out by the company, of living lines and others height safety systems. Sends it to the customer with all the necessary documentation. Does the certifications and the QR code of each safety system installed by the company, to they can use the safety systems. Does valuation surveys. Talk to the customer if the company has to do some review. If everything is fine prepares the file for billing. In addition. It is responsible also of the later revisions.

Humans Resources Area:

This area organizes, directs, coordinates and study the work and social aspects related with the activity of the workers. It is responsible to select and form the own workers. It controls that the own workers have all up-to-date documentation so they can do the job. Moreover, the area manage the agreements and payrolls of all the workers of the company.

Formation Area:

It is the area in charge of formation and students recruit. Manage with *ANETVA* the formative program of the training courses organized by the company; also manage the trainers who do it. These trainers does the practise and theory during a week. After the course, they examine the theoretical and practical knowledge of the students. This area accredits the certificates submitted to all the apt students. Moreover, it elaborates the monographics that each company needs.

Production Area:

It manages the work teams and the general planning about the different company works. In addition, this area manages all the own worker's accreditations and permissions for they can access and realise each work. Realise a follow-up of each work and awards resources that the different activities needs to each moment, so that each work goes well. The goal is minimise the unexpected problems so that everything goes according to the initial forecast.

At the work there are 18 own workers, divided in teams. Each team distributed for the different works, according to the type of work and the speciality of each worker. For all the works, the teams have to be minimum of two workers to carry out the works on height agreeing to the

norm *(RD 2177/2004*). Moreover, all the workers have to have all the proper certifications and accreditations for each kind of activity.

How it is a small company sometimes it cannot do all approved work with enough guarantee, therefore in very specific works or at a bigger works, it needs subcontract other companies or autonomous workers for can finish all the works well in the planning time.

2.3 Activities

One of the main virtue of the company it is his possibility of work diversification in different sectors. Whenever possible, the company does the works with vertical access techniques. Good works to do in vertical are repetitive works and works with difficult access. These techniques reduces a lot the costs and sometimes the work duration. Especially for the works simplification, many times the company can does the work without auxiliary resources. For this reason, the company has more room of manoeuvre.

Building:

It is one of the areas with a high demand of work; mainly the company does the specific works subcontracted by others builder companies for his characteristic, although *Accés Vertical S.L* also has capacity to bring the big projects as a main contractor.

Advertising works: These works are fast works, how the placing of elements of big format, usually posters and banners.

Cleaning: Mostly, are works for buildings with a curtain wall, big windows, singular elements, etc. These works consist of the handmade dirt removal on the walls, with tools and no abrasive products that vary as the type of materials. Sometimes with specific tools for the employers can clean the entire work surface. In addition, it can clean factory walls with different coatings for later can realise other works, like painting or waterproofing treatments.

Remove asbestos: These works consist of the removal and treatment any kind of the asbestos cement elements, sanitation facilities, roofs, skylights, gutters, etc. The company is on the register of *RERA* (Registre d'Empresas amb Risc per amiant). The government of Catalonia and the waste agency to make all processes for removal and transportation of asbestos waste approved this registered. The workers need some specific PPE and special equipment.

Rehabilitation and conservation: These jobs has very different kinds of work, consist of the remodelling, restoration and conservation of internal and external buildings. Some of these works are the restoration of inner courtyards and party walls, roof or walls waterproof, sanitation facilities, placing of protections, like anti-slip nets or visor fall arrest net at the ground floor.

Industry:

The works in this sector consist in spaces adaptation, maintenance and/or improvement. The company does the maintenance of structures, works to confined spaces, improvement or creation of accesses with the suitable safety systems. Many works are for warehouses, workshops, theme parks or mechanized places, in addition to power plants, petrochemical plants or wind parks.

The company has an industrial rescue team (*AIR*) that if it is necessary can realise rescues to injured people and solve technical incidents in zones with a difficult access or extreme conditions.

Civil work:

Currently there is not much demand, but the company have done work for the embankments protection, big rocky surfaces sanitation, pipes and drains.

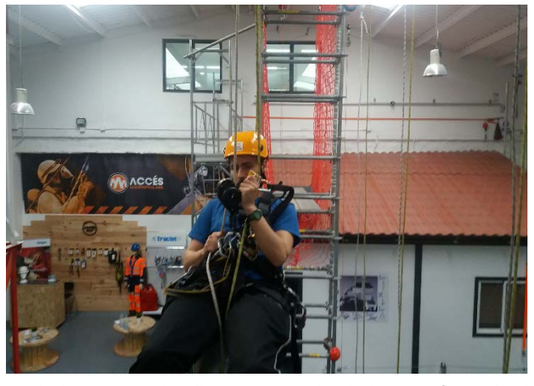
Safety systems:

This sector occupies an important part of the workload company. Many projects that come to the company are for the installation of safety systems, such as horizontal and vertical lifelines, anchor points, rails lifeline, access stairs, railings and walkways. The buildings that require these facilities are all that which need regular maintenance and do it is not safe for workers, according to the *UNE*. Besides the installation works, the company certifies and check out these safety systems and PPE to use them correctly.

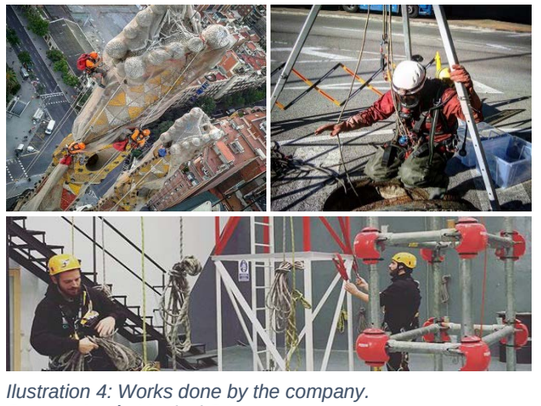
Vertical work training:

The company has a training center accredited by *ANETVA*, currently located at 87 Cobalt Street from *L'Hospitalet de Llobregat* in the same building that the office. Work and height official technicians teach the courses. They are different courses (OF BASIC AND OFIII OFII) and monographics about work at height, confined spaces, safety and risk prevention in height, etc.

I attended a monographic organized by the company with an accredited training technician of *ANETVA* that taught all courses accredited. In this course, I could see all PPE used in vertical work and learned vertical techniques. I could hang myself from different simulators and practiced vertical work techniques.



Ilustration 3: I, doing the monographic in the Accés Vertical S.L. facilities. Source: Own.



Ilustration 4: Works done by the company. Source. Accés Vertical S.L.

3. SCOPE OF THE WORK DONE

The company has a common work methodology to all the technicians. It is the same to all the activities. The methodology and the organizational and management system of the company are related. The company has the certificate ISO 9001, so I had to be very careful and tidy in all areas to meet the norm. All technicians must be coordinated, so it is very important to have the same corporate model and keep it forever, to solve the job to the same way.

Then exemplify the methodology that I have been learning in these six months of practices, under the tutor supervision. Primarily in general and in the next section more specifically to the study of the most significant works, classifying them for each type of activity.

3.1 Working method

At the beginning, I learned slowly the essential bases to know the material, suppliers, vertical work techniques, organization and operation of the company. Gradually I going to develop more responsibility tasks.

Accés Vertical S.L is a construction company, so their goal is to achieve a profit for each activity developed, to grow and position itself as a leading company in the building sector. To achieve this it is important to do every step with very carefully and professionalism.

Previous visit:

When a customer contacts to the company to do any work, whenever possible, a first visit is made to see the work zone and see all that it needs. With the visit we get more specific estimate, because can analyse lesions better, measure dimensions, see materials and construction systems, take pictures, check access and view the customer requirements to understand what he needs. After that, all this information is studied at the office to send the best deal possible.

In this visit is very important to show safety, professionalism and confidence to the customer, because at the end is he who will eventually accept or reject the project.

When it is not viable to the unavailability of the customer or the long geographical distance with the work area. The company develops the budget with graphic documentation by the customer, but record that it is approved only with a previous visit to verify that the work can be done as the study.

Graphic documentation:

After the visit and after studying the best option, in the office the first one is draw the necessary graphic documentation. This documentation serves to help the customer to understand the budget and tasks to do to solve the problem. For the industrialist, also, if he needs it to understand the types of material and the features that it has (measures, properties, materials compatibility, etc.).

When the customer approves the budget, all this documentation also serves to the workers so that he can do the work. If the jobs are complex, draw the work procedures or construction phases to make it easier for them. They can see and do the tasks without a doubt.

These blueprints have an important area, the floor plans, elevations or building's section to can see areas of activity, system peculiarities, etc. Sometimes, to complete the main part can be put details, work area's photos or use material's photos. The second area completed by a legend, that explains the symbols used, an overhead building view and information block. The information block is essential to identify the plane, the drawer, the client, the jobs location, the date and place and the company logo.

Ilustration 5: Graphic documentation example.
Source: Own

Building's plan example:

1. Main area. Floor plan.
2. Building's photos.
3. Location view.
4. Information block.

The security system plains, such as the illustration 5, are very important in the work execution. Because in these documents can see the safety systems design, their situation and dimensions for everything can work fine. In the other works should be clear the work to do and actuation areas.

All budgets submitted must have a good graphic documentation, as in the case of discussion or further problems, It gives the reason or not, along with the written.

Contact with the industrial:

Once these documents have made it, is easier for the industrial. In many situations, the contact is made with some industries to compare prices and features. To order the material price, we must specify everything that which we want or how we want it. The company has a different suppliers and special prices with there. When the budget comes to the office, we check that. If we detect a mistake, we notify it to the industrial and he resubmit a new offer. When everything is ok, considering the offer most suitable and introduced the material prices in our budget's calculation.

These industrials are very diverse and depend of the company activity. Some examples of safety systems industries are *Fallprotec, Exmatra, Igena, Tract*el, etc. Depend on the system's characteristics that each manufacturer has it. We choose a product more suitable. As auxiliary resources company are *Kompe* for example, it rents cranes and elevators. To rehabilitation's works for example, they are Sika in sealing products, Valentine and Hempel in paints and *Texsa* in waterproofing.

Calculate and write the budget:

Once we have all the graphic documentaction, we know the work's phases exactly and the prices of industrial products, we can start the budget.

Firstly, we make the work's planning for each task of the work to know the necessary resources with our performance and data sheets of materials. All this information is introduced at a calculation table with all the things that influence on the price (drive, performance, expenses, supplies, rents, cost of materials, material decreases, margin percentage and profit margin).

To make these calculations should be sure the work phases, the workers access and the zone of the anchor points, because these items can change the price. If the work phases varies the labour price also. All of this affects at the budgets items and the final construction price.

Next to these calculations, we write the budget with a company program named *Sage*. This program allows computerize all offers to facilitate the management and classify them according to the company needs. The program has all the customers' data and all budgets made in the last years. To do the budget we have to perfectly describe each task and use material in every budget item. Therefore, the customer can see, without a doubt, the company's offer, everything that we planned and the price of each item.

At the footer, we indicated the working hours, payment terms and any exceptional condition to consider.

When we put each item with her price, the program convert all the data into a PDF file. Later we attaching a cover, the plans, a corporate catalogue with images of different works done by the company and the company related certificates.

Risks evaluation:

When the customer approves the offer, we opens a file with all the information from the budget. The production department does the planning and schedule the work within the company calendar. It takes into the company resources.

Before the work start date, we have to write a workplace risks evaluation, based on the law 31/1995 of 8 November, *Prevenció de Riscos Laborals*. This inform has the study of all the tasks to do in the work, the techniques used, machinery, protective equipment, etc., with their potential risks, according to probability and consequences.

With this information, the company does the necessary measures to reduce the chances. At the end, the document has an emergency plan in case of accident and emergency road to the hospital and nearest medical center.

Onsite work visit/Follow-up visits:

These visits are made the first day of the work and periodically during the work. The first day, we explain to the construction manager every task of the planning, provide all the necessary documents and sign a document with the customer if it is necessary.

In short or easy works there is not a follow-up visit, but everything else works always advised as to monitor the process to we can solve the problems quickly, to control the workforce timing, speaking with workers, etc.

In these visits I could see the different working techniques, especially vertical techniques, problems can arise, worker's doubts to the execution, materials, tools, safety equipment, machinery, etc. During those six months, I was able to do the follow-up visits of work's different types:

Height safety systems installation:

A very important part of the work that *Accés Vertical S.L* performs is the safety system installation, maintenance and certification of these safety systems, according to the norm. These works are of short duration, usually one or two days and they rarely last more than five days. The duration depends on the lifeline's length, the quantity of lifelines and their anchor points, the kind of anchor points and the installation or revision zone.

Building fronts cleaning:

It is a building maintenance work. When we did the study and assessment activities should take into account the kind of building fronts, quantity and type of surface to be cleaned and the accessibility to the work area. The material is relatively cheap, so the assessment of the performance and labour it is a more important thing.

Asbestos substitution:

These works are necessary for the buildings rehabilitation, for those who were built in the twentieth century that used asbestos mixed with Portland cement to produce construction elements such as downspouts, chimneys vent, roofs, etc.

The most important thing to do this works are the support facilities, EPIS and all the rules and work procedures to apply the correct replacement of elements of cement and waste management. I had to consider all these things to do a budget.

The fibre cement is a material that is introduced at the beginning of twentieth century. It became popular under the brand *Uralita*. Insulating and fireproof properties that the asbestos have and its low price made this very attractive for the construction. Mixed with a binder (Portland cement) was manufactured a light products, cheap and easy to handle mounting. The fibre cement was banned for use in construction when the time shows that it is very dangerous to health.

If the fibre cement is in good condition, there is no danger of inhaling asbestos particles, which it causes a disease of the respiratory system. The disease is known to asbestosis. So fibre cement elements can be used until the end of its useful life, but we must take special care when they break, wear out or handled improperly. Because in these cases, asbestos particles can remain suspended in the air.

Whenever there is a work to replace any element of fibre cement, the company has to make a work plan for the assessment and prevention of exposure risks to asbestos. This plan are regulated by *Reial Decret 396/2006.*

These preventive measures are more important, because there are periodic inspections by the government to control them.

Currently there are many elements installed in all the country, because the popularity of that material in the past. Every time there is more willingness to replace them with other new materials that have the requirements of current regulations.

Rehabilitation of facades and inners courtyards:

The company does the renovation of facades and inners courtyards in buildings built over a variable time ago. This time depends on the exposure to adverse and maintenance of the building concerned. The work serves to repair the building injuries over the years and thus increase the useful life of the building. It is very necessary to solve these types of injuries that may have appeared throughout the life of a building to avoid the structure problems.

This activity consists of different tasks depending on the type of facade (curtain wall, brick or finished with a coating, etc.). Therefore, the element has been studied to see tasks to do in each building, depending on the injury and material.

Some buildings have facades with discontinuity and unique elements and/or cantilevers, the access to do the work it is difficult. For these reason, many construction companies and homeowners choose to do these activities with vertical works.

The yield for this type of work is slow and the material is expensive, therefore when we follow-up the work we have to know the planning very well and follow it as well as possible, because it is the plan used to calculate the budge. Checking that have the least possible incidents and that they have, can solve them quickly.

Reports/Reviews:

Periodically, the work for reviewing safety systems reaches to the company (safety systems installed by the company or brands that the company can manipulate). Another works are reviews of building facilities or building injuries. After doing the work, we report each review to deliver to the customer.

The use of these reports is to know the work done by the company and the building injuries to identify the problem. However, before the work also, it used to study building systems or facilities, assess injuries and find possible solutions, but without prices.

3.2 Sistemes de seguretat en altura utilitzats

To know the design of safety systems, primarily we have to study the risk areas and falling risk factor. Then design the route and/or location of the different systems to minimize the risk of falling.

The fall factor depends on the position of the anchor point with relation to the worker and his harness. This factor ranges from 0, when the anchor is on the worker's head and the rope is stretched over the person, to 2, when the anchor is located at the height of the feet. To more fall factor, more dangerous consequences for the worker. If we have factor number 2, we have to install retractable devices that cushion the fall.

Horizontal lifelines:

It is the most common safety system installed on flat roofs without collective protection systems, sloping roofs or overhangs. Also, installed in industry indoors or warehouse stores whenever there is a falling risk. There are two different types:

Flexibles horizontal lifelines:

They are lifelines (LDV) with a steel cable 8mm fixed to anchor points at the ends with turnbuckles and absorbers. If the lifeline exceeds a certain length depends on the type of cover must be installed intermediate anchor points to decrease the angle of maximum flexion between anchors. The workers are fixed with personal protective equipment and trolley with which allows moving to the deck always attached to the lifeline. There is also the double karabiner attachment that the worker should be fasten them to each section. It is cheaper but not comfortable. Such lines are approved under the norm UNE-EN 795 / C.

These horizontal lifelines are the most demanded by the customers, so is the safety system that I worked the most. Doing all the work before and after the installation (graphic information, contact with the industrial, participation in the reports, etc.). To install this type of lifeline must take into account the type of roof, to know the best route, brand, model and more appropriate anchors.

Some important buildings, in which I have participated in the installation project, are the *Palau Sant Jordi* and the *Convent de San Agustí* from Barcelona, among others. In the next section, there are the installation phases of a horizontal lifeline fixed on the perimeter deck walls of the *Convent de San Agustí* from Barcelona.

Rigid horizontal lifelines:

Also called lanes work. Typically, we installed this in high ceilings or interior zones because it allows tasks in suspension, but also there are in walls or inclined and outside decks. These lifelines are designed to fix them with structural anchors to any resistant element. Are regulated by the norm *UNE-EN 795 / D.*

The projects that I have done for the installation of these lanes are normally for industrial buildings, they need it for maintenance of machinery or vehicles. In addition, I designed safety lanes to trucks of water management and different types of buildings. I made all project phases of an important building, from the first visit until delivery of the budget. It is the *Torre de*

Collserola. It needed the installation of complex horizontal lanes due to its curved shape. These specific lanes must be tailor-made by the industrial.

Vertical lifelines:

These lifelines are installed in metal vertical ladders with long stretches without landings or back protection. They can be:

Flexible Vertical lifelines:

They are regulated by the norm *UNE-EN 353/2*. This lifeline works with a different carriage that horizontal lifeline, because it has the absorber inside. Unlike the horizontal lifelines, they are anchors only at the ends.

It is a good system to enable zones in height with the current regulations, enabling previously installed ladders. The anchor points are installed in the ladder's structure.

I have used this lifelines to enable different areas, mostly industrial buildings, as the building located in *Parets del Vallés*, as can be seen in the annex.

Rigid vertical lifelines:

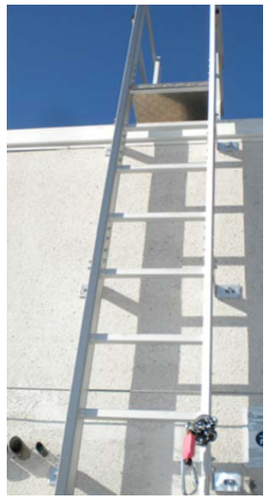
Are called vertical lane. Approved by the norm *UNE-EN 353/1*. Many new vertical ladders incorporates the fall arrest system, like the model SafeLadder of Fallprotec.

This type of lifeline is sold together with the ladder, because it cannot be installed later. This system is easier to use when the worker has to fix later to horizontal lifelines, because he does not need specific PPE.

For example, we installed in different facilities of *Terrassa* or in a new construction of *ZAL de Barcelona*, where I participated in the phases of the project.

Ilustration 6: Curved lane installation. Source: Accés Vertical S.L.

Ilustration 7: Vertical flexible lifeline. Source: Accés Vertical S.L.



Ilustration 8: Acces ladder with vertical safety lane. Source: Accés Vertical S.L

Anchor points:

Anchor points are elements which the workers can fasten the personal protective equipment (PPE). Are regulated by the norm *UNE-EN 795/A1* and the *UNE-EN795 / A2* in sloping roofs.

They may be temporary, if the workers uses them to access work areas for different company works or permanent. The permanent anchor points are installed so that the customer can use them for maintenance work, cleaning, etc. Usually we used them to attach retractable devices or ensure work areas where the installation of another safety system is not profitable.

I used them for example on the overhang's of the *Teatre Apolo* and the interior of the *Sagrada Família* in Barcelona.

Access ladders:

The vertical access ladders are approved by the norm *UNE-EN 353/1*. The ladders are necessary to adapt the deck, because it is used to access to the others safety systems. Depends the height it incorporates the vertical safety system and/or back protection.

For example, this access is used in the deck adaptation of an industry plant, a new construction of the *ZAL de Barcelona*.

Railing:

The railings are collective protection systems and they serves to protect the falling hazard from usually crowded areas. They are regulated by *ISO 14122-4.*

They can be fixed to horizontal or vertical supports, but also without fixations that drilling the roof, called counterbalance railings. This last are very useful if there is space on deck to have a quick and easy installation.

I used this solution on sloping or flat roofs, where the surface elements, such as machinery, solar panels, etc., did not allow a lifeline's route in a safe way around all the deck, or if the deck frequently needed the access for more than two users.

PPE:

These are personal protective equipment, that each worker must carry equipped to do any height or vertical work safely. They are essential for the use of all the safety systems written above. For every safety system, workers will need some common PPE, as the harness, and others more specific ones, depending on the manufacturer and the type of safety system, such as the transfer trolley.

For each installation budget, we offers the specific PPE to use each safety system valued. If the customer wants to buy other necessary PPE such as a helmet, harness, rope, etc., the company are provided them separately.

Temporary lifelines:

Textile, rope or cable safety systems. Usually we installed to do a specific height works with safety. These safety systems save installation time, because they only need the end anchors to fix the lifeline. On de other hand they have a limited shelf life, especially in outdoor environments they properties faster than the permanent safety systems. These lifelines can be vertical or horizontal.

The *Accés Vertical S.L* workers install these lifelines to do the works with safety. If the customer is the one who has to do the work, we study the installation and disassembly of lifelines and the material price; because once it is used the customer can keep it.

As a particular case, we see an industry plant in *Arboç*. We installed vertical and horizontal temporary lifelines that the customer could check anti-fire system.

Retractable devices:

It is a fall arrest device. The device is installed in anchor points and as an additional safety measure in vertical lifelines without a retractable trolley. When there are drop factor number 2. It is required installation. It has a drum with steel cable or textile tape that locks when there is a fall. They usually have an integrated energy absorber that absorbs the shock of the blockade. It is regularized by the norm UNE-EN 360.

These anti-fall systems are fixed in an anchor point. Alternatively, it is installed in a work lane if the customer wants to be mobile and the worker can have room for movement. In addition, it is a complement to the other safety systems.

Ilustration 9: Counterbalance railing. Source: Accés Vertical S.L.

Ilustration 10: Work safety Harness. Source: Petzl

Ilustration 11: Retractable device. Source: Accés Vertical S.L.

5. CRITICAL APPRAISAL

After I saw all the work done by the company there are different ideas that I analysed this with a critical vision to see problems and potential solutions that I found in these months. This reflection is contained in the following paragraphs.

Firstly, I think the previous visit is essential and cannot always do. Sometimes because the customer needs speed of response or sometimes because the distance of the geographical area where the work must be done with regard to the company's location. Many customers do not want to pay a technical visit and if the company wants to do the job, it has to send an offer with conditional approval only if can do a visit. I had to make this kind of offer. So although it does not seems, without this first assessment we lose a lot of time writing the offer, because we act conditioned by photos or information that comes from the customer and we have to write less specific items or limiting meters or areas evaluated. Perhaps these budget items do not conform fully to reality. Also lost a lot of time to solve doubts and the real project needs. If after the approval, we does the visit and we have to modify the budget, it must be re-approved. These complications are difficult to solve because they cannot make all the visits of projects that come to the office, and should prioritize. However, we should be aware that the speed of response and customer's requirements lead us this way. This situation is not good, because then have to waste more time in monitoring the work.

Secondly must improve some work organization. On the one hand, as it is a small company, it tries to do the same person responsible for the project and the execution. As the company grows and the work also, there are not enough resources to tackle all projects with maximum guarantees and that hurts the result. Moreover, to improve regular monitoring of works and therefore improves the work results, the technicians could diversify the work between the design phase and the work execution. Another possible solution is to create a best hierarchy among workers with fixed job title for every work or make fixed work teams. Doing this clear hierarchy of workers, the company can retain long-time workers and they would want to do a good work. They would improve the execution control, forecasting works and reaction to the problems.

Third, because the complexity and uniqueness of vertical works, the costs of each work are different and we have to do new calculations for each budget. However, I missed some yields or targets costs databases of previous works to make a real run prices of the most common tasks. This would reduce the time to bid, especially at first, but it would help a lot to adjust the price more to the budget without losing the profit margin.

Fourth, we must be aware that the graphic documentation are indispensable for make the offer to complete the budget. Following the award of the project, the plans are also important for workers to know the work procedure. Increasingly, the company wants it. Most budgets have plans, it is a good sign, because many previous budgets did not have plans and I had to make many graphic documents afterwards, to attach to the final report delivered to the customer. These plans are made in DIN A3 format and colour, but the company always delivery plans in black and white and DIN A4 format to the workers. I have also observed that workers do not take the time to see all the specific documents.

Fifth, another detail to take into account is that at the beginning of the work, a technician cannot always move there to explain the work to do. So sometimes, there are problems in the execution, for this reason, the company can lose some days later to do a review in finished works and unable to bill. All these problems could be solved with the appropriate graphic documentation. Moreover, with a meeting between the technician and each work's manager to view different work's documents and answer any questions before going to work, when the technician cannot go to the start of work.

Sixth, I noticed that the kind of customer and his relationship is very important in the company's planning, also with knowledge of the type of work and suitable worker for their execution. Thus, the company could make more accurate planning, because it would know better the start day of work and its duration. In this way, it would have no problems with overlapping works. If the company is subcontracted and it cannot do the work according to the initial planning, as the installation of safety systems in the *Convent de Sant Agustí,* the company has to keep the work team in the next planning, especially the construction manager. This avoids unnecessary delays in the execution process.

Seventh, I would like to stress that the workers usually do not take photos to the work done. We have to ask specifically about each task or work. Take photos makes office work easier, to prepare reports of safety systems installation, reports of works, reviews or inspections if it needs them. The company could solve this shortcoming with regular meetings about methodologies, between workers and managers of the company. Alternatively, the company could do internal trainings to the workers, so that they know what to do in each incident or activity. A checking table or a computer facility could also help to do this routine work easier for workers.

Finally, one detail that can help inner working and the work result is task specialization. It is possible if there is daily volume of each type of work, so that each worker has specific competences of work. This is difficult to do because the work diversification that the company can do, and irregular volume of each kind of work.