QUALITY IN CERAMIC TILE SETTING

by Vicente Sanchís León

TECHNICAL ARCHITECT

The ceramics industry is constantly producing materials of increasingly higher quality, more perfect finish and more singular and spectacular design.

It seems that the limitations which existed in the past with respect to format, size, texture, colouring and ornamental motifs have now completely disappeared.

It seems that current technology has made it possible to create any product regardless of how daring its design may be.

The most important question arising as a consequence of these factors is whether it is possible to use these ceramic materials in accordance with the high quality of the product itself, to achieve the desired result: a high quality finished tiling job.

How can we define what we mean by a high quality tile setting job?

There are different ways to define quality; however, since ceramic tiles are covering materials, and consequently, finishing materials, we believe that perhaps the most accurate definition in this case would be one combining the idea of quality more or less with the concept of the product satisfying the client or consumer.

But what do consumers demand from tile work?

First of all, they want a completely uniform and durable surface. In fact, if we do not manage to fulfil this basic requirement (that the ceramic material covers the wall completely and uniformly and does not come off), the tile work is not achieving the minimum quality required. When this primary, indispensable requirement has been fulfilled, there are others, such as: the organized distribution of the different elements, the satisfactory executions of joins, the aesthetic organization of the tiles and their decorative motifs.

In so far as we achieve a uniform surface, with a geometrically arranged distribution, and the tiles do not become dislodged from their position, are organized in an aesthetic composition, with correctly formed joints between the tiles themselves and between them and other extraneous elements, we are achieving quality tile work.

At this point it would be useful to analyse the factors or agents which can facilitate this achievement or make it more difficult.

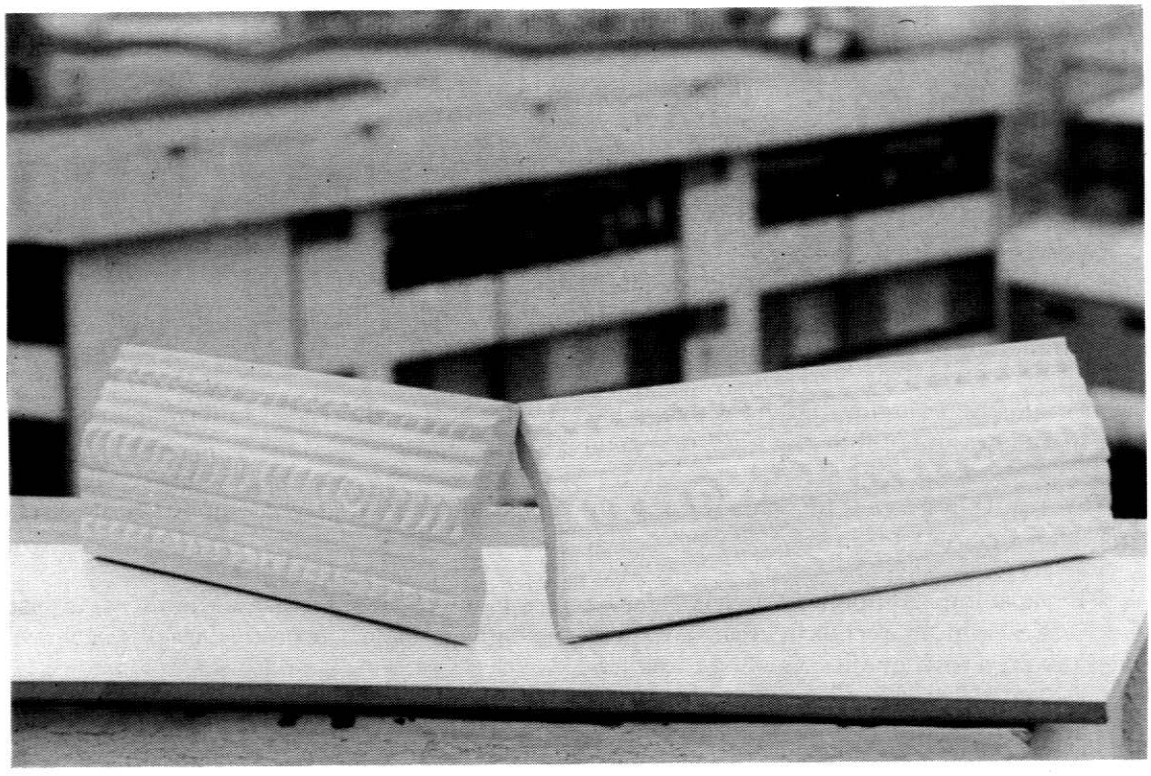

Photo 1.-Moderm design has produced singularly daring pieces

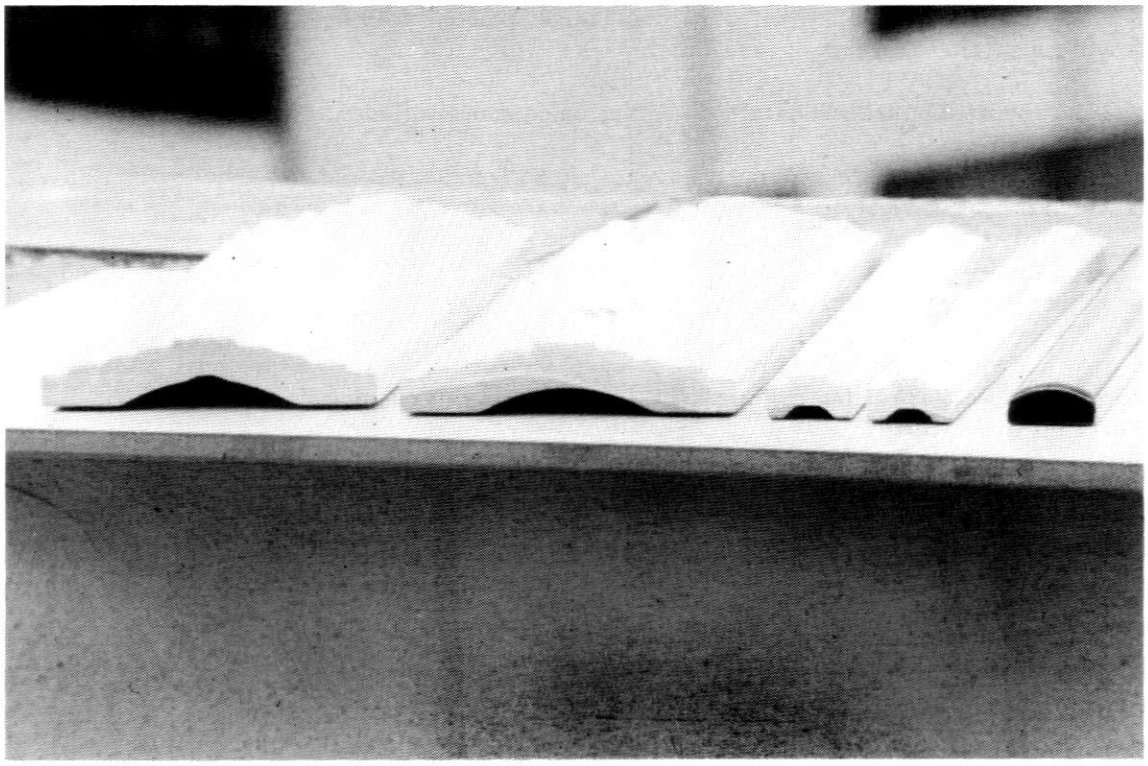

Photo 2.-Ceramic technology has made possible a wide range of products.

LABOUR

In the first place, although we will not dedicate a great deal of time to analysing this problem, there is the question of the person or persons employed to set the ceramic tiles.

Tile setting as a skilled trade began as a branch of masonry, and it can be said without fear of error that both trades suffer from the same problems with regard to the acquisition of skills.

Learning a skilled trade requires time and the necessary knowledge must be transmitted by a master in the trade. Furthermore, it is obvious that a hurried work pace imposed by the demand for high productivity makes the process more difficult. The priority in this case is to cover square metres of surface, and everything else is secondary. As a result, poor installation of top quality material can result in an unsatisfactory end product.

Although labour is certainly one of the most important factors, there are a series of other equally important variables which decisively influence the final overall quality of a proper tile setting job. We will now enumerate the most important of these factors.

THE BASE

The suitability of the base onto which the tiles are set is fundamental in the achievement of proper tiling, and it is not always given the importance it requires. It seems that because the wall is to be covered with the tiles, it is assumed that the finish can compensate for any defects in the support. And this is not true.

A tiled surface on a wall which is not properly constructed, plumbed and squarely joined to other walls will reveal these defects in the tiling.

The support should also be stable, have settled and be a sufficiently solid constructive element.

In renovation work we frequently have to deal with recently constructed hollow brick partition walls which must be tiled hardly allowing for the mortar in the brickwork to set.

Good adhesion can only be achieved by thorough picking over and clearing, thus completely eliminating any existing remains of previous coatings.

In other cases, especially in renovation work, we encounter walls which have previously been plastered or where the previous coating has not been thoroughly cleaned off, making it difficult to stick the new tiles to the surface.

Another aspect of the base surface which can cause problems when laying tiles and which makes them liable to come off is the heterogeneity of the base, as in the case of a joint between brickwork and reinforced concrete pillars. The different movements of these heterogeneous supports, and the differences in the adherence factor make it difficult to ensure proper adhesion. The consequence is that the tiles come off.

A further difficulty arises with the question of space or rather due to its scarcity. Very often, in order to maximise usable surface areas, tiles are laid directly on to elements which form part of ventilation system ducts. It hardly warrants mention that these elements are in entirely inadequate base for tiling and in the case of a tile being laid directly on to such a surface, the likelihood of it coming off is greatly increased. One solution would be to line the surface with brickwork of at least 4 cm. thick, and then setting the tiles on to this lining.

The Technical Standard "NTE-RPE ENFOSCADOS" (NTE-RPE Mortar Fillings) in the section "Design" recommends the rodded rendering coats as a ideal base for "façades and interior walls when the rendering coat itself is to be visible or if the final wall-tiling cannot guarantee a perfectly flat panel surface as in .....or using tiles smaller than 5x5 cm.". It is obvions that in this situation we include tiling jobs involving small size tiles since it is practically impossible to achieve a perfectly flat finish if the base itself does not have a similarly flat finish. This can only be achieved through the use of trowd applied rendering coats.

The geometry of the supporting structure is the remaining factor which should be mentioned.

Walls to be tiled sometimes include joints with structural elements such as buttresses or pillars. This may create small panels, the size of which must be modulated so that an integral number of tiles fit the area. Otherwise, it would be difficult to lay the tiles so that each line begins with a whole tile at each edge of a pillar. If, in addition, the tile has a linear decorative motif, the appearance of this area of the tile work would leave a lot to be desired.

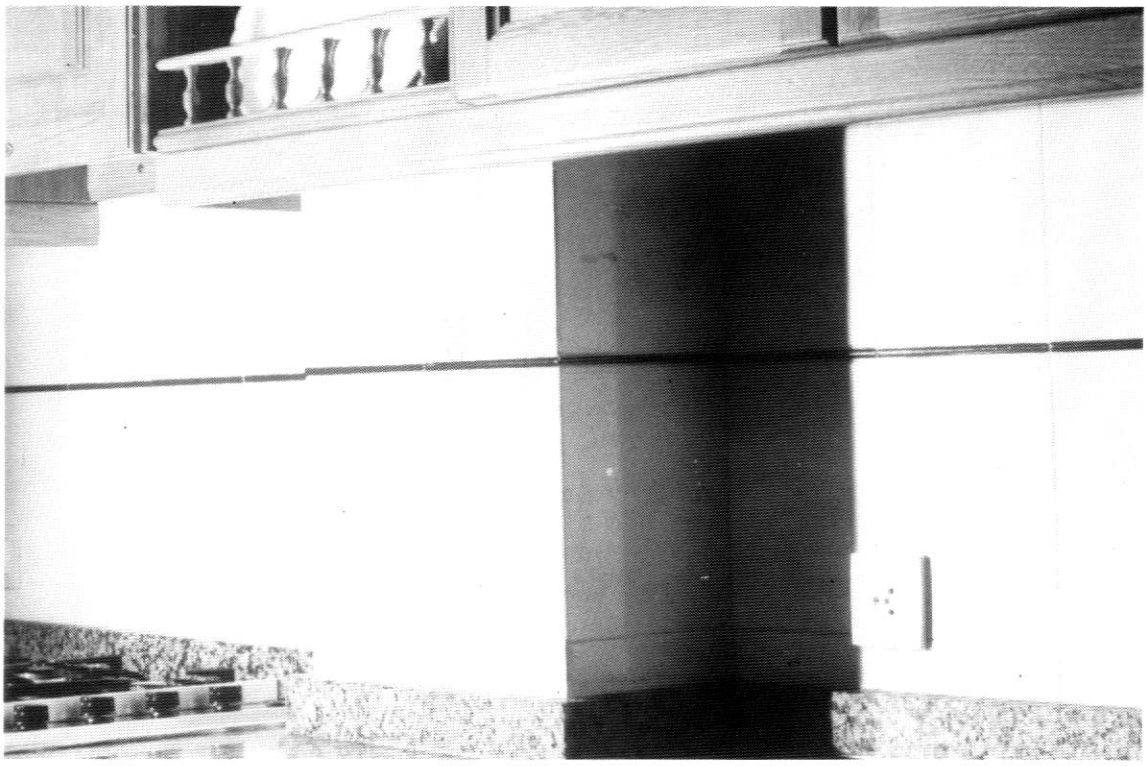

Photo 3.-The existence of buttresses in a wall makes tiling difficult.

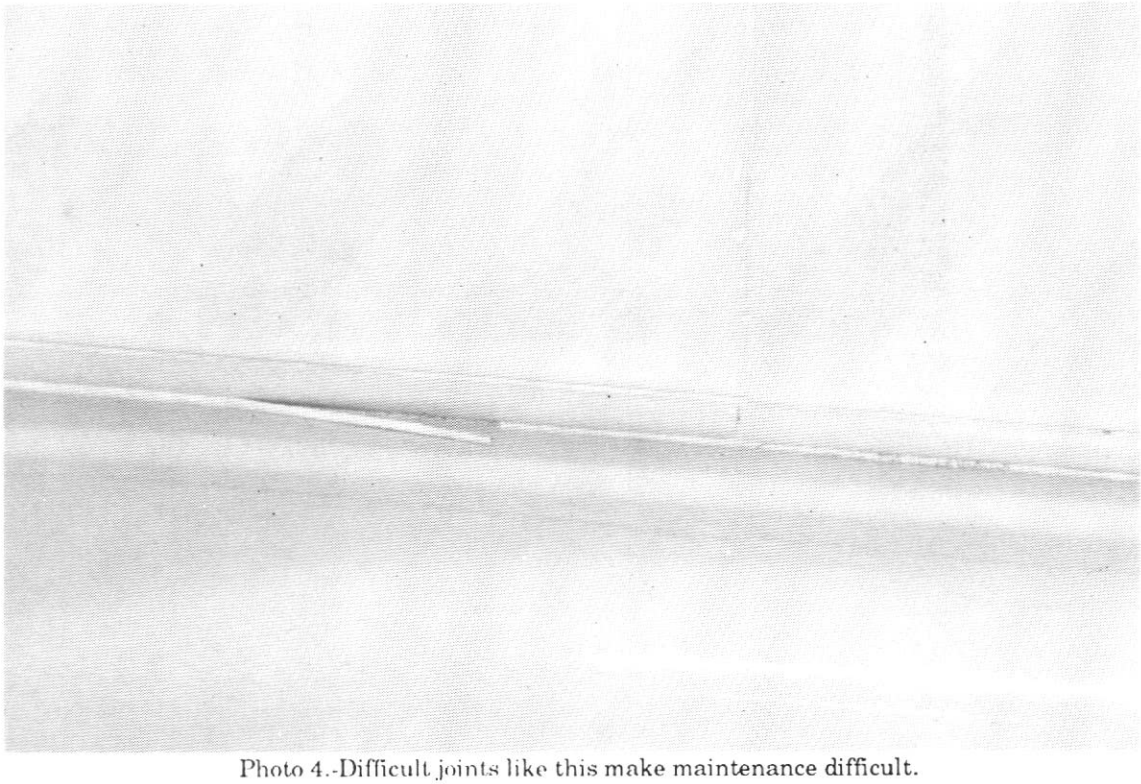

Photo 4.-Difficult joints like this make maintenance difficult.

Photo 3 bis.-The heterogeneity of the base is one of the causes of tiles comi

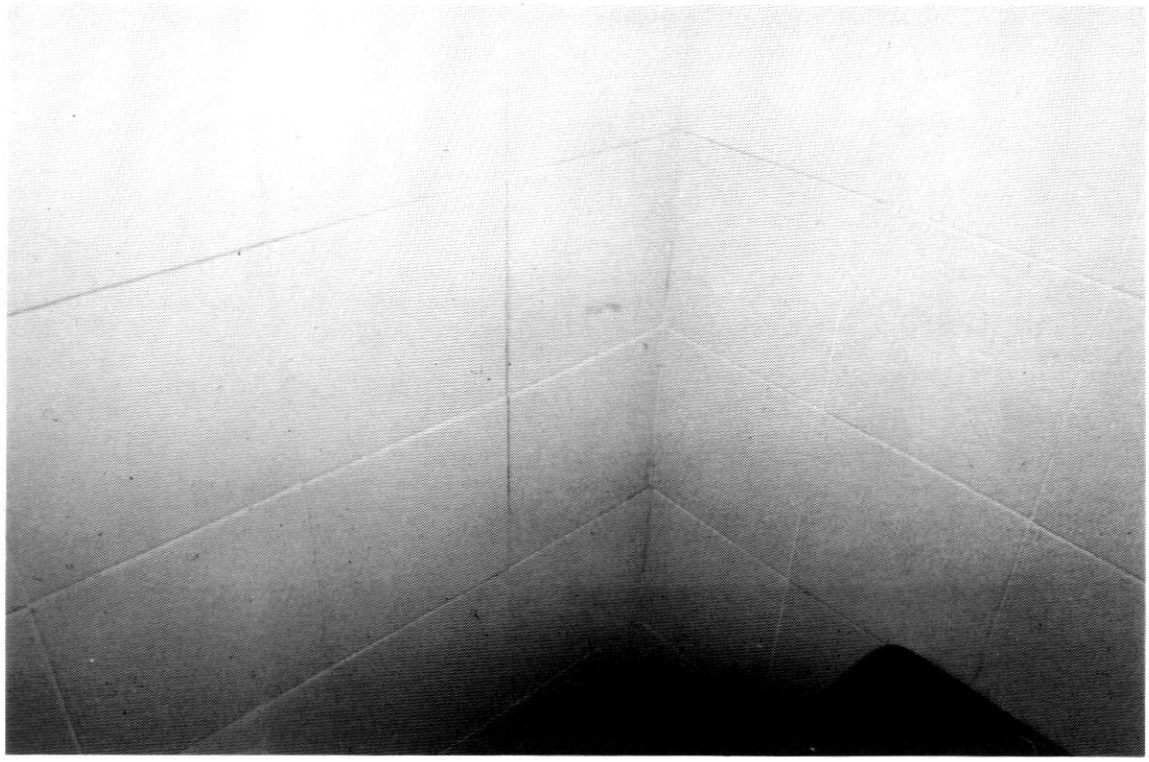

Photo 4 bis.-Tiling over a base lacking in due stability can in the future cause tiles to be displaced, as is the case with this tiling job, done a ventilation duct

THE ADHESIVE MATERIAL

The different adhesive materials which we can use to set the tiles and the correct choice of material are additional factors which affect the quality of the finish.

In general the importance of using plastic plasters should be emphasised since these achieve the close contact necessary for optimum adhesion between the base material and the biscuit of the tiles.

With respect to the use of binding mortars, it is important to emphasise the necessity of only using products which have a *Documento de Idoneidad Técnica* (document of technical suitability). This certificate does not guarantee the quality of the product, but it does guarantee that the product has been tested for use in tile setting by the technical services of the Instituto Eduardo Torroja, which certifies its suitability for use under correct conditions. That is, if we follow the instruction for use exactly, we can be sure of using the product correctly.

An aspect which is given little attention is the need for the adhesive material to fill the space between the back of the tile and the base without leaving gaps.

The large tiles which are currently fashionable make it more difficult to completely fill the space

behind the tile, which sometimes causes tiles to break when they receive a blow or when a hole is drilled.

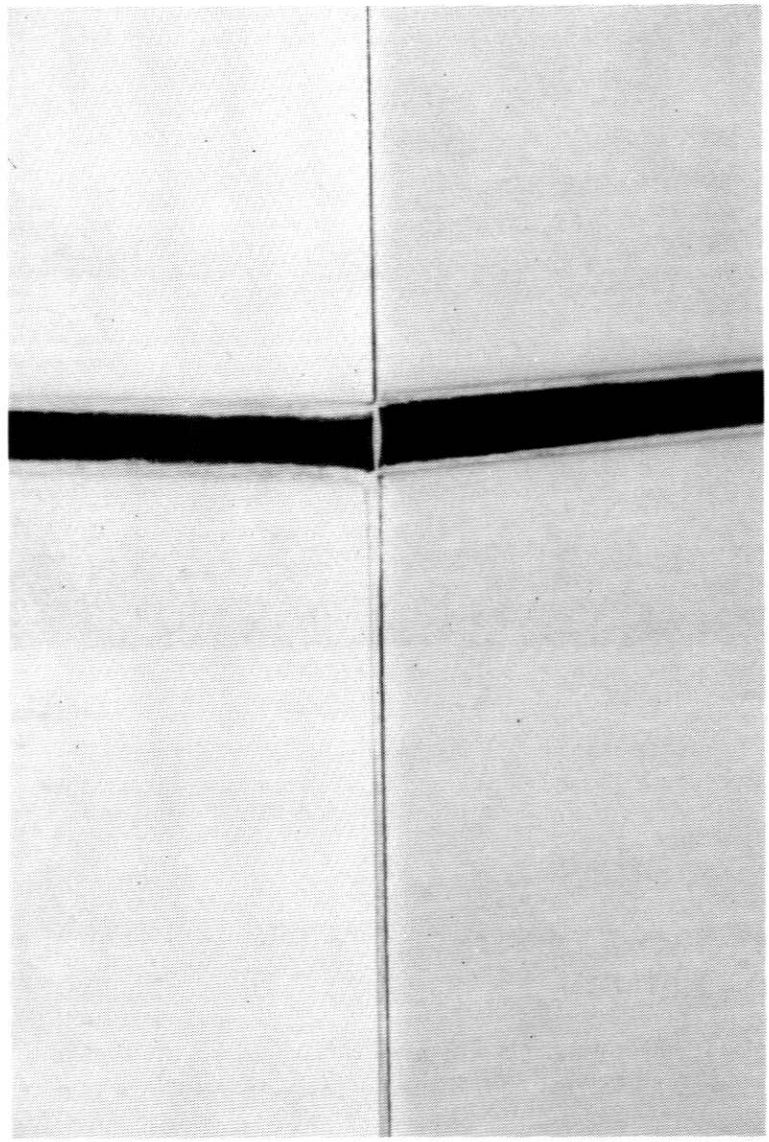

Photo 5.-Defects in corner joints affect the overall quality.

THE CERAMIC MATERIAL

The greater or lesser relief on the back of the tiles can mean a more or less effective adhesion of the tiles to the mortar. It is worth noting that the more vitrified the tiles are, the more important it is to have a relief which facilitates adhesion, since these materials are less porous and therefore offer less adhesion.

Another variable is the degree to which the tiles are dampened before they are set. Sometimes this is insufficient causing the mortar to lose water, which lessens the adherence to the tiles. On other occasions, the tiles used are saturated with water. In this case the pores of the material are full which makes the penetration of the mortar into the biscuit more difficult, lessening the adhesion and increases the possibility of tiles coming loose.

The ease with which the tiles may be cut or bevelled is another significant aspect in achieving a good finish. It is practically impossible to do tile work without cutting tiles, and if the tiles chip when they are cut or bevelled, the finish of the job will be substandard.

Ornamental motifs on the tiles have traditionally been another factor which has posed difficulties in achieving a high quality finish in tile work.

Some motifs, especially those featuring closed geometric forms, make it impossible to realise a design if the length of the perimeter to be tiled is not an integral multiple of the size of the tile.

The size of the tiles is another variable which can affect the quality of a tiling job. In order to achieve a flat surface, small tiles must be set on a rodded rendering coat; otherwise a perfectly flat surface is an almost impossible goal.

The difficulty of using large tiles lies in achieving a solid fill with the adhesive material, which is why it is a good idea to set the tiles in tile cement.

Finally, the shape of the tiles themselves, owing to the achievements made possible by new technology, is currently one of the greatest difficulties in achieving a good finish.

The greatest difficulty is in using tiles with a surface relief. Depending on the depth of relief, it can become impossible for the tile setter to align the surfaces of the tiles, making it more difficult to achieve a flat wall.

Tiles with surface relief are frequently used to create borders or to form a listel. The relief makes it particularly difficult to correctly bevel the edges and to ensure proper corner joints in the listels. The problem arises because the piece is inevitably rectangular and set according to the short side which leads to misalignment of the joints of the listels or of the edges or corner joints.

It would be helpful if the manufacturers included special pieces for corners in their product lines, or made listels twice the length required by the format, which the tile setter could use to make the pieces needed for these joints.

THE TILE SETTING PROCESS

Once again the tile setter's skill is an essential element in the achievement of a quality tile setting job. In addition to setting the tiles correctly he must be able to resolve a series of specific aspects affecting the tiling job as a whole.

Assuming correct handling of fundamental tasks such as laying out, and levelling and the correct assembly of ornamental motifs, let us consider a few aspects which can deteriorate the appearance of the finish of a tile setting job.

One of these is the correct formation of the bevelled pieces. If the pieces which form the mitre do not form the correct angle at the corner, the unglazed interior of the tile may be seen, which will mar the finish of the job.

The joints made where the tiles meet other extraneous elements are also important, and the quality of the finish depends on foreseeing the problems involved.

The places where the tiling meets the edge of the bathtub include two areas where a poor finish can often occur. One of these is where the tiles join the tub forming a lap. It is usually necessary to cut all the ceramic pieces which form this joint, and if they are not all cut to exactly the same length, the imperfection is shown up by the straight line of the edge of the tub.

On the other hand, depending on the length of the tub, it is possible that there is a shelf at the foot of the bath. This shelf forms an dihedral angle with the lap which joins the bath, forming the inevitable triangle with one curved side, making it necessary to cut these pieces so that they match the curve. To avoid this difficulty this triangle is often filled with mortar which produces an unacceptable finish.

The problem of cutting the lap pieces as well as that of creating the triangle which is difficult to finish can be avoided by slightly displacing the plane of the lap, about 1 centimetre towards the interior of the bath.

Another joint which is frequently badly constructed is that produced by the openings for the water pipes or drains. Openings for these fixtures should be made by drilling the tile, and not by first cutting it in half to make it easier to cut the opening.

Electrical fittings are also extraneous elements which, depending on how they are organised, can deteriorate the finish of the tiling job.

Sometimes, owing to poor planning, these fittings coincide with the border or frieze of the tiled area producing a dissonant result.

Another place where poor planning can interfere with the decorative effect of the tiling is in the kitchen. In this case it is fundamental to carefully plan the layout of the tiling to avoid having a border, planned to be equidistant between the upper and lower cabinets, too close to one or the other.

Something similar can also occur when isolated decorative pieces are used. If the height and position of the cabinets are not carefully planned with these in mind, we may end up with the vanes of a windmill emerging from a counter top, or with part of a pan or kitchen utensil hanging from the

From the information explained so far it is easy to deduce that to improve the quality of a tiling job all of the parties involved must be implicated: manufacturers producing tiles designed to facilitate the job of installation; tile setters making the effort to adapt their knowledge to the new products

Ajoint to wacht out for is where a listel whit surface relief meets the architrave of the woodwork around an opening. The only correct solution possible is to gauge the measurements of the architrave and interrupt the listel before reaching this point.

The proper or improper use of several products currently on sale is another important factor in the job of tiling. Such is the case with PVC corner brackets which are used to achieve a proper finish in cases were the use of certain ceramic materials for tiling makes it difficult to make corner joints. The corner brackets must from a surface which is correctly connected to those which form the two planes of the tile.

The final phase in the tile laying process, that of jointing, also deserves a mention.

Of the two jointing proceedures in use, dry or by means of cement slurry, we decided to opt for the latter since it is the one wich improves the jointing materials penetration and consecuently gives it greater durability.

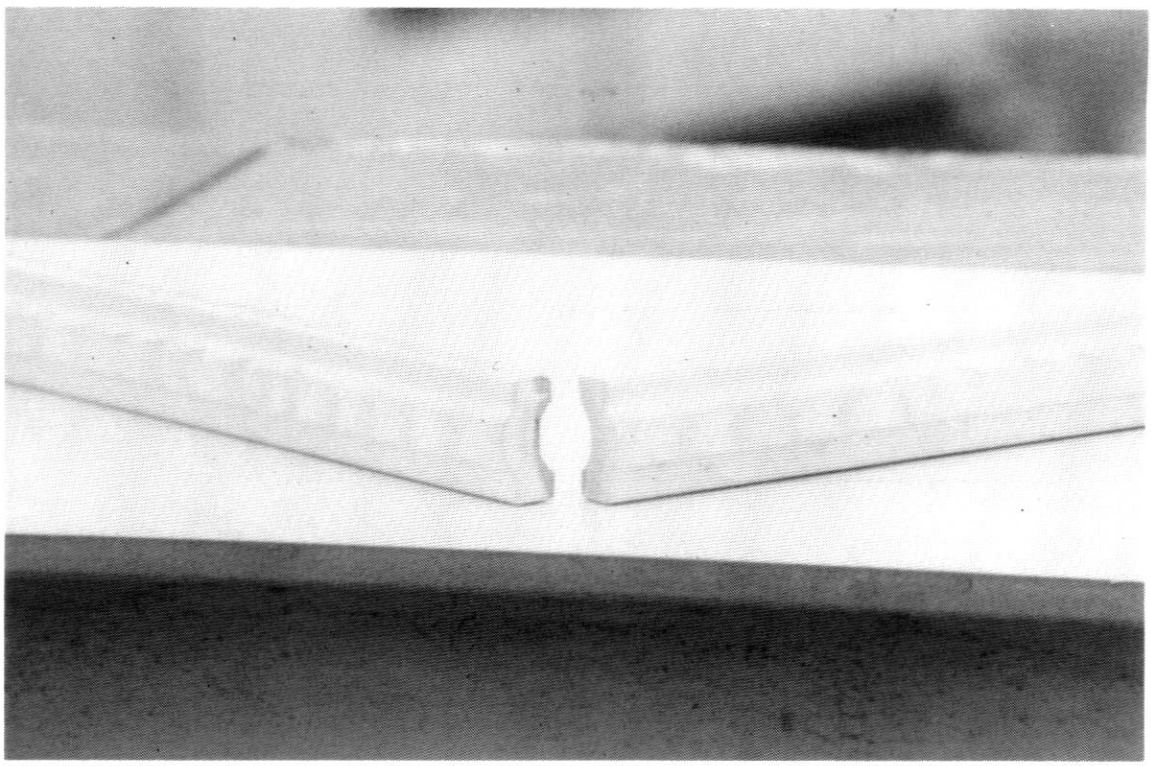

Photo 6.-The relief in the listels makes it more difficult to achieve a flat surface and neat joints.

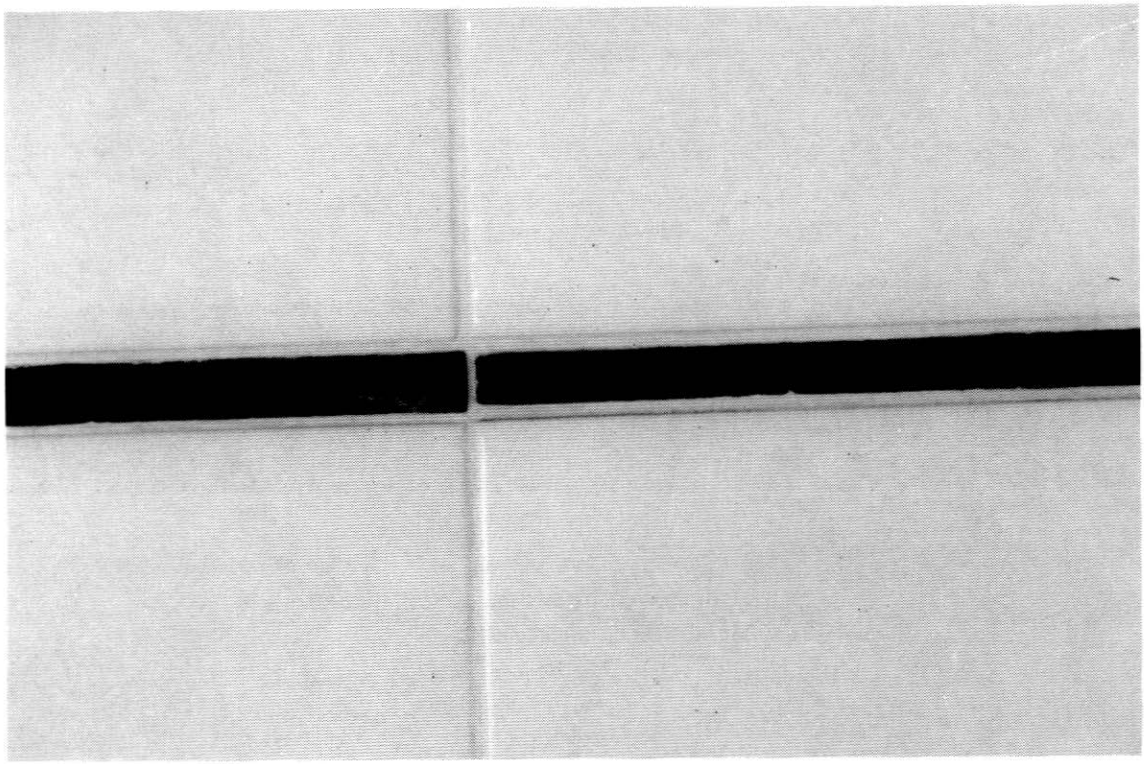

Photo 7.-If the tiles are set according to the projections of the relief, the piece will be set more deeply than required.

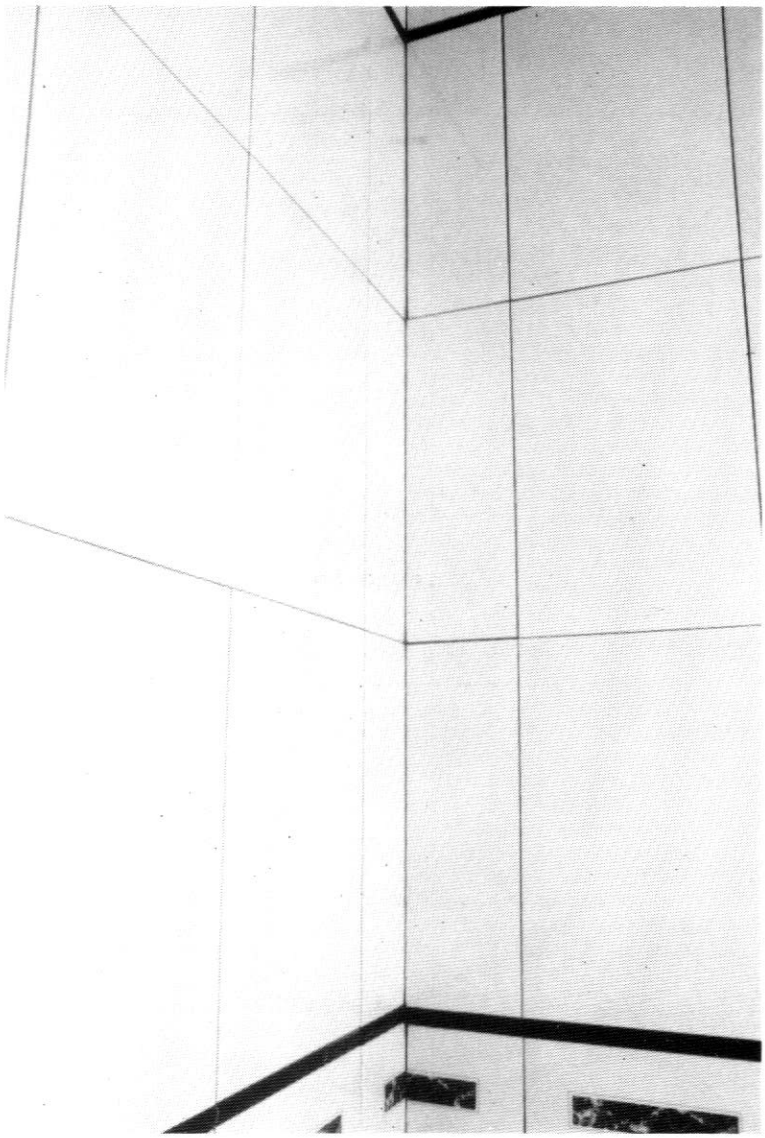

Photo 8.-The shape of the pieces used conditions the possible joints.

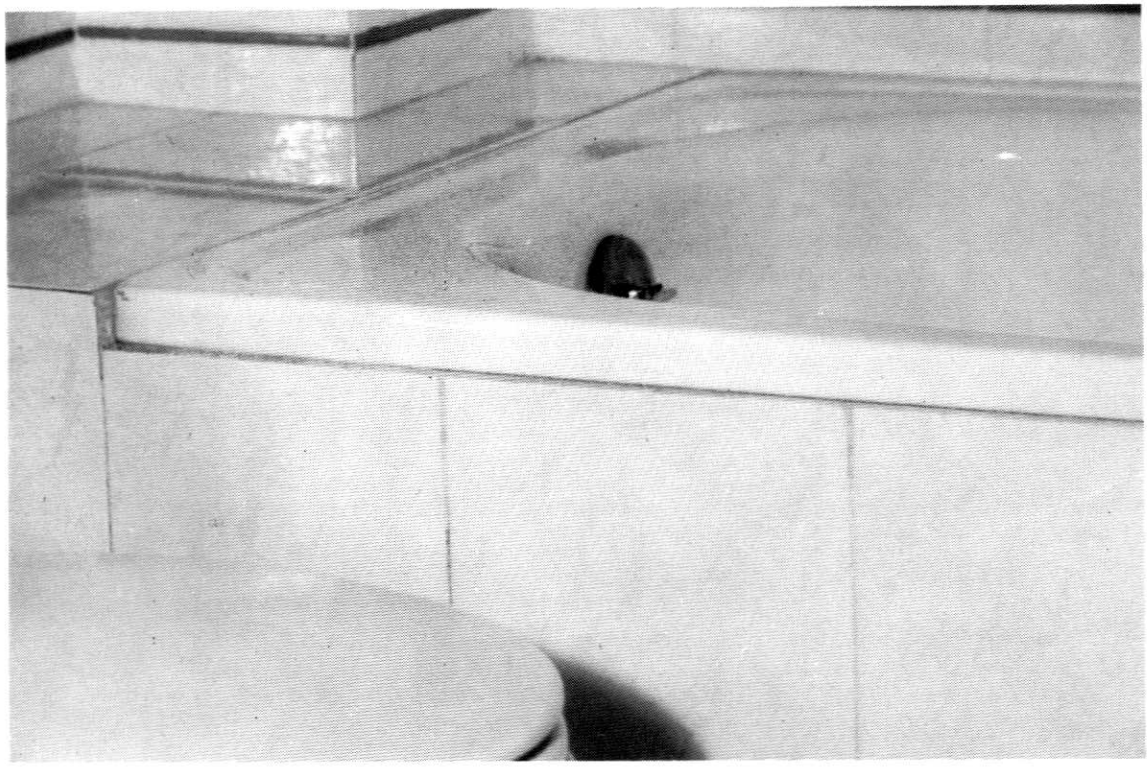

Photo 9.-The join between the lap and the bathtub is often difficult.

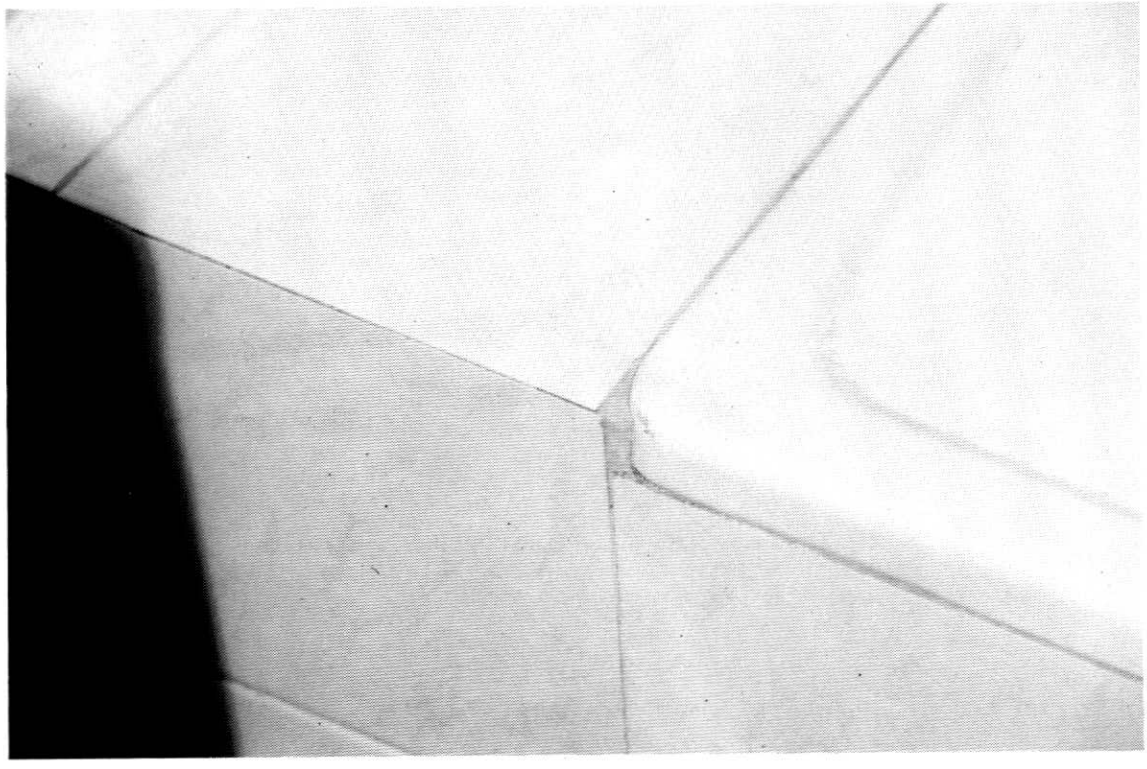

Photo 10.-The point where the bathtub meets the dihedral angle produces the inevitable triangle with one curved edge

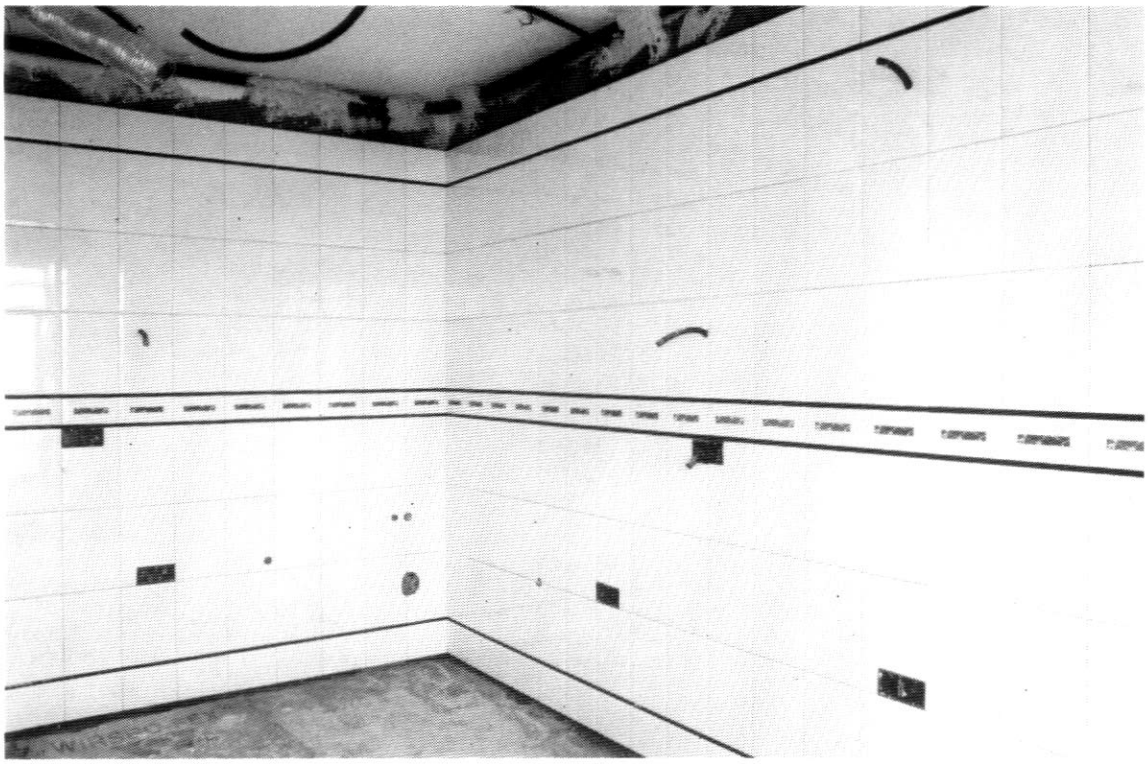

Photo 11.-The joins between the tiled area and the fixtures and fittings must be carefully planned in advance.

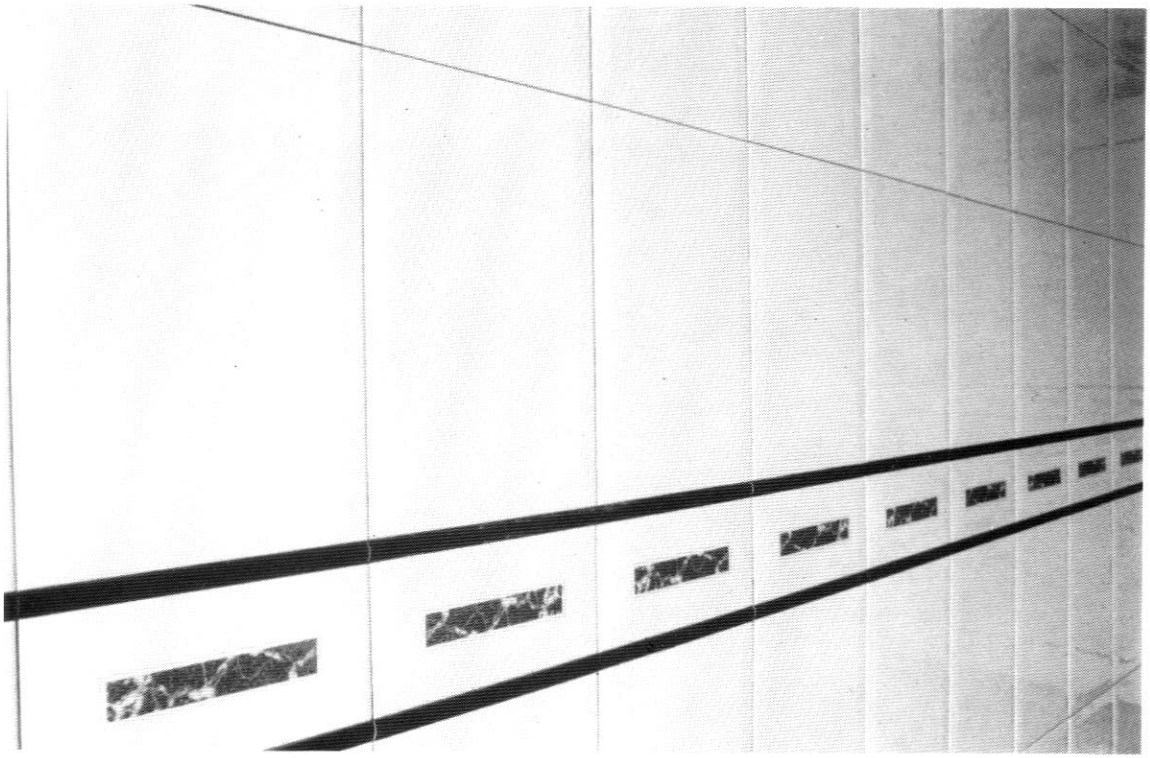

Photo 12.-Designs like this one make it possible for the listel and the most projecting parts of the tile work to be on the same plane. The most difficult part is the organisation of the corners.

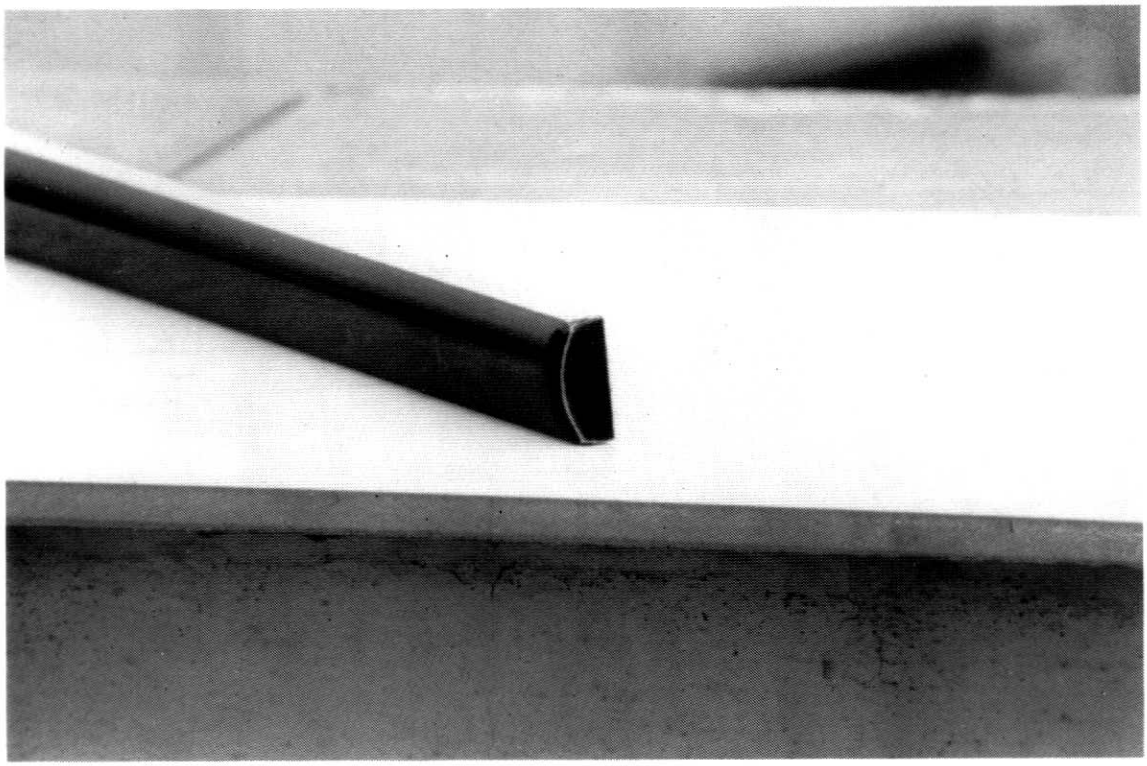

Photo 13.- Listels which project from the flat plane of the tile work make corner joints difficult.

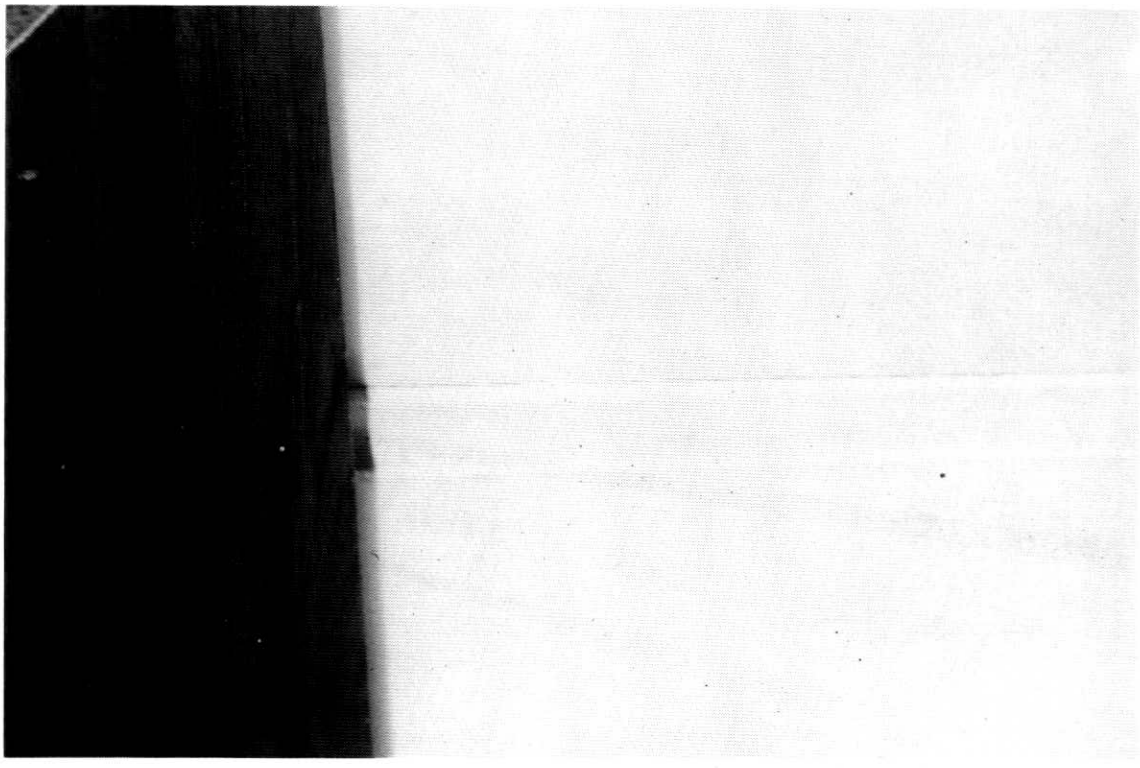

Photo 14.-Joints between listels with relief and wooden frames it necessary to gauge the end of the listel.

Photo 15.-Tiling which leaves the biscuit base of the tile visible, as in the case of this corner, does not offer even the most elemental level of quality.

Photo 16.-Finishing touches such as this corner bracket must be correctly lined up in order to achieve continuity and tangence between the sides of the angle.

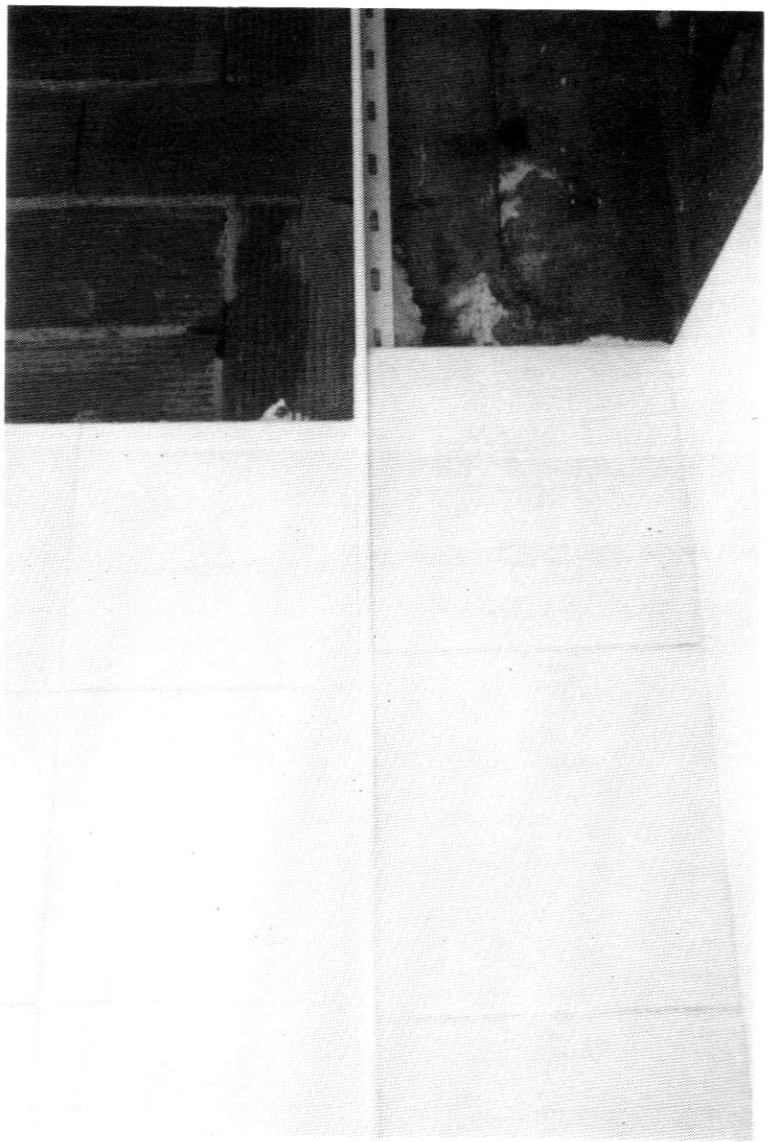

Photo 17.-The adhesive material permits the raising of ceramic tiles to the same level as the edge of the corner bracket. If this is not the case, surface continuity will not be true.

From the information explained so far it is esay to deduce that to improve the quality of a tiling job all of the parties involved must be implicated: manufacturers producing tiles designed to facilitate the job of installation; tile setters making the effort to adapt their knowlwdge to the new products which may appear on the market; and technicians trying to offer solutions which are viable for the users as well as for the skilled workmen involved in the tile installation.