

lationship. In this practical instance, we decided to keep a normal general contractor for 85% of the work, and we ourselves undertook all the specialty work—heavy wood columns and beams, special concrete castings, manufacture and installation of intricate tile work, and the innovative concrete lacework trusses.

We were able to make beautiful and expensive column capitals.

We made, by hand, in our own workshops, four thousand tiles with a pink and gray design described earlier (Book 2, chapter 10), and ourselves installed these tiles on the upper walls of the building.

We undertook the highly specialized gunite work needed to make the trusses—a very tricky job, since we had years of experience of gunite shooting on delicate form work, and these trusses had a most complex configuration, with extremely difficult mid-air work needed to do the forming and shooting.

Thus, although we only held about \$200,000 total of specialty construction contracts, the fifteen percent of the work we did ourselves affected the building deeply, and made an

enormous difference—with a far smaller risk and far smaller management problems than if we had taken on the whole responsibility of the building work in our own company. It was an extremely practical compromise, which allowed living processes to act where they mattered most, to the benefit of the building.

The positive consequences are clear enough. In effect, I chose 15% of the work in such a way that it covered 50% or 70% of the building's emotional and artistic impact.

So, in this relatively large project, we came close to controlling the entire construction work by this indirect means.

Of course, in addition we still had normal architectural control over windows, walls, floor surfaces and so on.

All this left the San Jose building with an overall quality of hand-made work, attention to detail, and care for the individuality of each individual element within the building. And yet the building was built at a relatively low square foot price, far from the kind of price which such a carefully detailed building would normally command.



11 / THE INTRICACY OF DETAIL IN A LIVING PROCESS MEMOS ON CONSTRUCTION METHOD

In order to create a vivid picture of the kind of work which is necessary to make a larger building come out right, I will print, here, an edited form of a memorandum I prepared for our client in the San Jose building. He originally asked for this memorandum to help him solve some political problems of his own and to help get us paid money that was owed to us. I print it though, because it gives graphic insight into the essential intricate and detailed nature of the construction process when the fundamental process is applied to a large building.

Here is what I wrote:

January 29, 1989
Al deLudovico,
Housing for Independent People,
City of San Jose,
California.

Dear Al,

A story in *The San Jose Mercury* written a few months ago spoke in glowing terms about the Julian Street Inn and its architecture. Further, from the very beginning of the project, the City of San Jose and the Redevelopment Authority saw the building as important because of its position as a gateway to the Redevelopment

Area. They therefore asked us to make a building which was beautiful enough to serve as a gateway to the area.

What is perhaps more vital than these architectural comments, concerns the situation and feelings of the homeless people themselves. I have told you, from the beginning of the project, that this building is intended to give homeless people a renewed sense of dignity, and a faith in themselves... this is being accomplished by their participation and by an unusual level of care and quality in the design and craft of the building.

However, from our discussion, it seems that many politicians in San Jose are unaware of the extraordinary amount of work we have done on the details of the building. Yesterday, you therefore told me that you would like to see a memorandum giving examples of the special care and attention which has been lavished on it.

Let me give you some examples.

I. THE IRON GRILLES

Let's start with the ironwork on four small windows in the entrance court. I first made a rough sketch of the grilles. I then asked James (Maguire) to make a wooden mockup in the actual windows, and tell me what he thought would work. He did so, making a mockup in lathing... and then made a drawing based on his observations.

I looked at the drawing, and felt uncertain if they were quite right. I made some more drawings myself, and then went to San Jose to check them. The design seemed too elaborate, and the earlier drawing seemed more in keeping. I went back, and went through the whole thing again with James, and we then prepared the simple version drawing for you, as being the most elegant. The construction cost of the grilles is in the range of \$1000, implying that a design cost of \$85 (8.5%) might be reasonable, i.e. less than an hour of paid time. In fact we spent nine hours on this one very small detail.

2. THE IRON GATES

On the gates for the Julian street entrances, we made a long series of sketches. First I made some hand sketches, and gave them to James. He then made a preliminary hard-line drawing. This drawing seemed too harsh to me, and I told him it had to be softer. He made some rough charcoal sketches based on our discussion. Then he made another set of hard-line drawings. . . but they had

lost the character of the soft charcoal drawing. We checked it on the site, standing with the drawing, and looking at the real thing on the building. Then I suggested to him how to make the final one. He made two versions, . . . and these drawings were then put in hard-line, and sent out to bid.

All in all, we spent two solid days, only refining the design of the gates. In a normal professional office, these gates would probably receive a couple of hour's worth of attention. What we are offering here is really an old style of work . . . the kind of thing that used to be done about 1900 . . . as on the San Francisco City hall . . . with an extreme level of detail, specified carefully, in keeping with the craftsmen. Today's architectural contracts do not provide for these kinds of services, and they are not normally provided at all. Even though we are paid the normal fees, we provide the extra service anyway, because it is the only way to get good results. But, in addition, it is done through mockups and full size studies on the real building, during performance of the construction subcontracts awarded to us — and that is how we pay for the extra effort.

3. THE COLOR AND GLAZES ON THE TILES

This is a case, where I am sure you cannot even begin to imagine the amount of time and energy that was spent. Over a period of more than a year, we made tiles of different designs: some of these you reviewed and rejected; many we ourselves rejected as not good enough. Finally we found a design that we all liked. It was based on a subtle way in which the color and design of the rose and gray tiles makes a harmonious whole with the gray color of the concrete between the tiles.

Oddly enough, it then turned out that the rose/pink/orange color of the tiles was very critical. At different glazing temperatures, the tiles come out at different colors, which balance less well with the gray of the design. The window of temperatures was very critical. We took steps in which we tried literally hundreds of different tiles, individually, in our own kilns here in Martinez, and then in the test kilns of the tile place in San Jose that did the final glazing. Every time we ran a batch, we tried different color formulas, different glazes, to get the colors just right. Towards the end, because of time pressure, we had to make tests in the big kiln, where no less than 600 tiles are fired at once — because this big kiln produces different colors. We thus began our production run, of the 4200 tiles to be produced, and were still running experiments and tests on each batch of 600 tiles that we sent through the kiln.

I used to spend an hour or two, every other day, for a period of months, each time looking at some twenty or thirty different tiles in our Berkeley yard, studying the different levels of color balance, and trying to get them just right.

Finally, to test the last sample batches, I had a crew of three or four people lay them out on the concrete of a building at the UC campus, so that I could see a complete array of several hundred tiles, against raw concrete —

and I then went up to the roof of the fourth story, to look down on these tiles, so that I could see them all, at a distance, roughly comparable to the distance at which the tiles are seen in the real building.

This operation, with a crew laying out several hundred tiles on the ground, was done not once, but about six separate times, before we finally had the tiles calibrated and glazed to my satisfaction.

We considered ourselves making something of permanent value for the people of San Jose.

4. THE CAPITALS OF THE ARCADE COLUMNS

The other day, when Pat Colombe (the planning and zoning officer) saw the finished arcade columns, she said something like: "I had no idea how beautiful this was going to be..." These columns, which were prefabricated in our own workshops, required the design and making of special molds for the capitals. I began this work about a year and a half ago. We built several molds, tested them, changed them... and as you know, we even have three full columns, cast in concrete, with samples of tile on them, standing in our construction yard in Martinez. The total time and energy spent on these columns represent literally hundreds of man-hours.

Of course the design fee paid for the design of the columns does not begin to cover the time spent. The columns themselves (nine columns) were delivered by us to the project, at \$12,000 installed. This would imply an architectural fee of some 8.5% of \$12,000 as a reasonable amount of design time, about \$1000, or perhaps 15 hours of professional time.

But the actual amount of time spent on these columns — on the design, not the production — must have been at least 200 hours... perhaps ten to twenty times what we were paid for. I do not say this in order to make you feel guilty, or to ask you for more money. I do say it in the hope that you will appreciate what you have been given. If some of our time spent on electrical layout was less than you expected, please bear in mind that on many features of the building we have gone far beyond the call of duty, to a level which is almost unknown in present day practice.

5. THE BENCH BACKS ON JULIAN STREET

Recently we have been getting the final shape for the bench backs along Julian. Here again we have something that might be considered a trivial item in many people's vocabulary — because usually there just isn't time or energy to take care of such things. Here is what we did.

First, at the time of our original cardboard mockups of the Julian street bays, I cut cardboard templates to fix the shape. Recently, with the building actually in place, we began the work of revising this template. James began by making two drawings of the possible shape. A downward arc is simple, but leaves something funny and uncomfortable in the corner, where the curve meets the big column. We had one drawing where the curve flattens out to form an S where it meets the column. This is better.

James cut another full sized template and I went to have a look at it. The S-curve was slightly too strong, and created a feeling which was too busy. I got another blank template, and drew a slightly finer curve, which makes a beautiful contact with the column, makes a good space between the benches, and make the back height comfortable all along the length. This tiny detail, of something already specified by normal standards, too several hours of extra work, and a number of visits back and forth.

6. WORK ON THE TRUSSES

The design time we have spent on the concrete trusses for the dining hall would simply boggle your mind. As you know, the delicate curvilinear tracery is a new kind of truss, one which has never been built before with this technique. During the early stages, I spent three whole nights *myself*, working on the computer analysis of stresses in the truss, and laying out the beautiful tracery. I am really talking about nights — three *whole* nights from 10 pm until 8 am the next day for mathematics . . . The amount of time that Gary Black our engineer put in, was far beyond what the engineering fee paid for . . . he has put in hundreds of hours, at CES expense, not HIP expense, checking details, checking horizontal forces, doing everything that had to be done to make it work, figuring out how to build it . . .

Even when we built the complete full size mockup for you to look at, at your request, we did not charge you. The \$800 on your bill was only for materials for the mockup. The time spent, by James and his helpers, to build this full-size, thirty-foot cardboard box truss, which took three people a whole weekend to do, was entirely at our own expense.

I am glad we did it. The trusses are beautiful things. I am sure the dining hall is one of the things which will be remembered about the building.

As you know, we also cast a complete portion of a truss, in concrete, in our Martinez workshop, so that we could get an accurate picture of the size, shape, character of the ribs and tracery... and get an initial handle on the techniques necessary to build the trusses.

7. THE SMALL REVEAL ON THE WEST WIDE OF THE DINING HALL DOOR

Here is a tiny detail. As you know, a decision was made, to make the kitchen jut back, where the dining-hall door opens out, so that this door could be a two-leaf door with a comfortable swing. What you don't know, is that when we considered this matter (*even though it is a relatively small thing*) we then made a full size mockup in our Berkeley office, and studied the size of the jutting out, in relation to the distance from the door, until we had a situation which felt completely comfortable in three dimensions. After all this study, this is the work that was finally transferred to drawing, and given to Paul Rudy.

It is because so many details were handled with this kind of care, that the building feels so comfortable. The reasons why people respond to it, and so many agree that

it is comfortable and pleasant there, is that this kind of care has been lavished on most of the details in the construction.

Most of this was going on during the work of building itself. The effort involved, vastly exceed the effort that would normally be given to such work, by the contract administration phase of a normal architectural contract.

8. THE ARCHWAYS OF THE TUNNELS

The archways as drawn on the drawings were only a rough approximation of the right feeling. As soon as the building itself was standing, it became possible to gauge the correct size, shape, and height, for the two archways. You told me at some point that you considered this as an *error* on the part of the architect, and that we were therefore liable for the design time and delay time involved in the extra work.

This is not the right way to look at what happened. I told you, when we began this job, that to do good work, we have a practice of monitoring a building continuously, during construction, and making small modifications as the work proceeds. Any architect who tells you he (she) can predict these things, is simply kidding himself (or you). The whole point, and the whole problem with modern architecture, is that you cannot predict these things, because they only become visible, in their details, when the building is standing there. We could determine the approximate height and diameter of the two entrance archways, at the model stage... and in fact did so with a number of studies in model form, which showed us how the sunlight comes in, what it looks like from the street, and so on. But then, it must be fine-tuned at the framing stage. What happened is that Henry Sterngold, or you, then gave the order to proceed with what was on the drawings, even though I told you that this was not the right thing to do, and that the right height and curve of the tunnel arch would only (and *could* only) be determined after plywood was in place. When the proper moment arrived, we spent one whole day of my own time, a day of Gary's time, and two days of James's time, making mockups to determine the proper curve, and to get the height right.

When Paul Rudy told me that you would not pay for the extra, I told him to bill the \$800 work of moving the plywood to me personally if HIP would not pay — because I care that much about the building, and because I knew how much it would damage the building, for the city, if the arches were left in their higher position. The building got a level of service and design care, not only beyond what was paid for, but, in this instance, far beyond the ordinary. It was a new kind of service, not yet known today!

9. THE DAY ROOM DETAILING

As you know, when I first saw the beautiful shape of the day room, I ordered the two partitions removed from the design, since I saw the effect this room would have, with its rhythm of columns and beams. So we spent time, at

that stage, to re-evaluate the design and make it better. Then, we spent hours in the room, evaluating the best size and shape for windows, and door openings. Most recently, I have shown you how the room will work even better, as a comfortable place, if the two alcoves on the south side, are separated off slightly, by a light wall which makes an opening, and strengthens the shape of the main space. We have also visited the room many times, to make mockups of the best detailing of the trim on the big beams . . . and have finally found a kind of trim which will make the room good, and bring a scale transition so that the roughness of the beams is offset by a delicacy of detailing in the moldings. To get this right, we actually built several example sections, and took them to the room, propped them up, eleven feet overhead (no very easy feat, for a thing that weighs 40 or 50 pounds), and then examined the different ones, from the room, until we had the one which was exactly right.

10. KITCHEN-DINING PASS-THROUGH

I am putting this mundane example in, partly because you were not at first satisfied with the way the problem had been solved, and partly because I want to demonstrate that small practical matters, not only matters affecting the overall harmony and beauty of the building, are being given the same level of care. As you know, CES originally designed a pass-through from kitchen to dining as the only way to solve the level change. Keystone, working directly for you, then unfortunately did a detailed layout for the kitchen which underestimated the difficulty of handling large soup pots. After discussion with you, Gary and I went to Keystone, and using the correct 70 lb soup pot, made physical experiments of the exact height to which it could be lifted, and recorded the results to the nearest inch, so as to fine tune the kitchen layout. The results of this study were then transmitted to you by James in the form of drawings, which represent an unusual level of concern, for a small practical problem ... even though you may consider this problem minor.

II. PAINT COLOR OF BUILDING EXTERIOR

The exterior plaster color, on the ground floor, has a critical role in the building, since it needs to be harmonious with the concrete columns, with the orange of the hand-made tiles and colors on the second floor, with the roof tiles and with the street. We had determined, long ago, that something of a grayish rose would be the right color.

In order to specify this color for the plaster company (Speed King) who were going to make up the mix... we started by mixing our own cement wash. We made a series of studies in our workshops in Martinez, tried many different mixes. We finally found a mix which was just right: it required four different pigments, two reds, a yellow and a green, in subtle proportions. We gave this mix to Speed King, and they began trying to match it. In order to get them to match it correctly, we made three visits to Speed King, tried their samples on different batches of rough and smooth brown-coat plaster... The choice of

color, and the exactitude of matching, involved three of our people, for several days work.

We also made samples of possible window enamel, based on these wall colors: tried cream, light cream, off white,... and finally incline towards a very pale green (really a white, with green touches in it), as the thing which is most comfortable with the rose of the tiles, and the grey of the concrete. To get it exactly right, a final round of mockups has been left for later, when the colors are in place on the building.

12. ORIGINAL DESIGN WORK

At one time in our discussion, after I gave you these examples, you made some comment like: "Well, it is true that CES has done a lot during construction, but you paid for it by doing very rough drawings at the original design stage... and didn't put a lot of thought in at that earlier stage." I told you, then, that this was inaccurate, and that during the design stage, as in the construction stage, we undertook a level of care far beyond the norms of present day architectural practice.

Consider, for example, the elaborate column capital mockups described above. These capitals represent perhaps \$2000 of construction — meriting some 8.5% of 2000 or \$170 in design fees: two or three hours of professional time. In normal architectural practice today, this would buy you the specification of a Simpson connector — and that is exactly what you would get under normal circumstances. From us you got, as I described above, several hundred hours of design time, mockups, studies, molds, and so on.

As another example, when we designed the exterior bays of the building, we built a complete full size mockup of one bay, six feet wide and ten feet high, in cardboard, in our own workshops, so that we could see it, study it, and get the dimensions of its details exactly right. The size, shape of windows, the position and shape of the bench backs, and the thickness of column, and shape of column moldings and capitals, were all set while we were working with this full size cardboard mockup. Almost no other architect or practice in the United States today would take such a level of effort, to work out the overall proportions of a design — of what is, in fact, rather a small part of the design.

This kind of effort went in continuously, to our work at the early design level. Even in that stage, the level of care and thought in the project, was way beyond the usually professionally expected level.

These twelve examples are merely examples. They are examples of a new attitude, and a new level of concern, and a new form of professional practice which has been lavished on virtually every aspect of this building, continuously, from the time design began, up until the present where we are nearing completion of construction. This level of care, which is unique to our organization, and which is possible, in part, only because it could be done within the construction contracts awarded to us, and the dedication of our apprentices and staff. As a professional service, it is not available on the market today, at any price, and remains something we hope to see in future among all kinds of practices, in an emerging new form of professional process. Today, the fee structure of a normal architectural job does not permit it.

As I told you in yesterday's discussion, I believe few people realize that the level of care which has been provided on this job goes far beyond what any other architect would normally be able to provide, and far beyond what we are being paid. I do not say this in order to ask for money. I gladly accept the work which we are doing, and it is our own desire to spend more time than our fee warrants, because we love the building, and we hope to see the building made permanent as a thing of beauty for the people of San Jose. We are doing this out of concern for the building, and because of our own professional pride in the excellence of the building.

I hope this memo gives you the information that you need.

With best wishes
Christopher Alexander