



*Two of the series of lacework concrete trusses we shot in the San Jose Homeless Shelter.
Christopher Alexander, Gary Black, Carl Lindberg, 1988.*

This guide-work is also easy to see, so that it can be modified as one sees the shape emerge. This is perfect for the construction of the field of centers since it allows one to maintain a continuous process of judging and changing, judging and changing.

We began experiments using gunite in late 1977. It took almost seven years of experiments to make it work smoothly. Now we know how to do it, simply, cheaply, and effectively. Illustrated above is a large concrete truss, shot in place against guidework in the air.



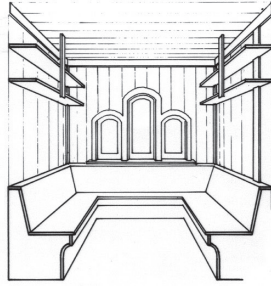
5A / WOOD AND CONCRETE COMBINATIONS

Conventional wisdom of the construction industry says wood structures and concrete structures should not be mixed in a single structure.

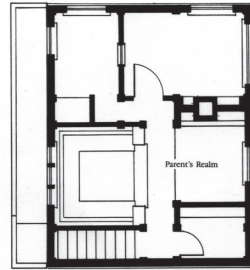
But in many cases, the centers you need to make on the outside of the building, and the centers you need to make on the inside are rather different, in scale, pace, and emotional quality. For this reason, my colleagues and I have often used combinations of concrete and wood.

In one technique we make centers, flexibly, by forming and pouring concrete: shapes, beams, columns, capitals, edges, bases. On the inside, at the finer scale which you want near your skin, wood and plaster — carved, shaped, finely molded, smoother — are more suitable.

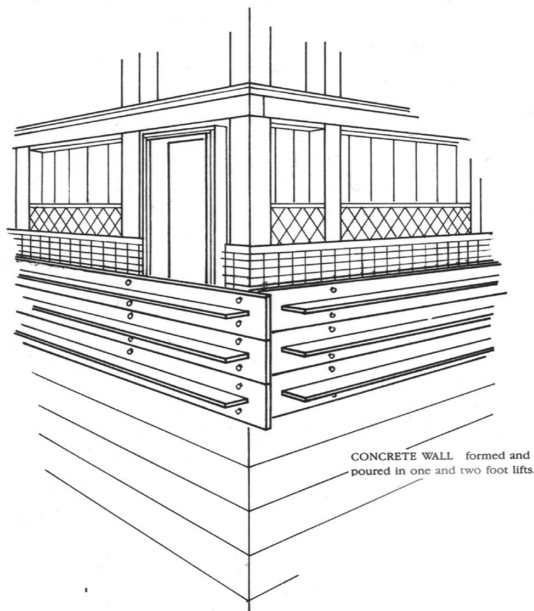
So in order to have a single way of building which allows the cruder more massive centers on the outside and the finer centers on the inside,



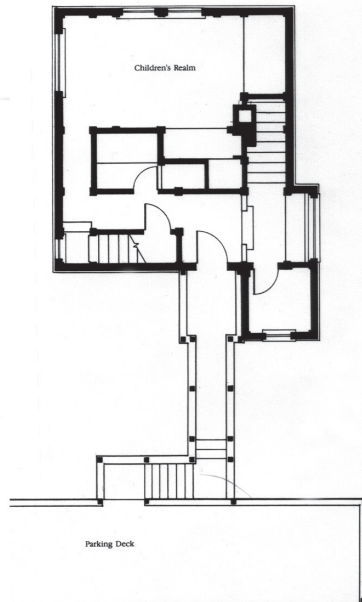
UPSTAIRS SITTING ROOM



THIRD FLOOR PLAN



CONCRETE WALL formed and poured in one and two foot lifts.



SECOND FLOOR PLAN

The Sala house, Berkeley. Construction scheme of the wood-concrete combination, showing the interior post-and-beam system, and an exterior two-inch concrete shell poured in 1 and 2 foot lifts in successive pours. Christopher Alexander and Gary Black, 1983.

yet within a single coherent system, we have developed ways of building which combine wood and concrete structurally—allowing the two to work together. A single system, with poured base, post-and-beam wood members, and plaster or wood paneled in-fill enables us to make centers flexibly, at each scale, and in the right order. The construction is done, concrete first, then wood, then plaster. The centers follow the natural sequence of the making.

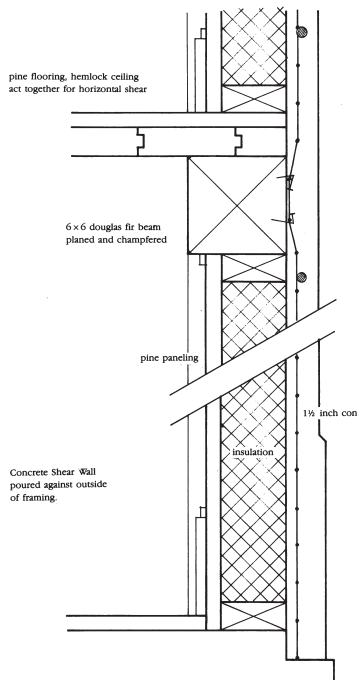
In a similar way, we have used structural combinations where wood is used for vertical forces, and thin concrete shells are used for horizontal and shear forces. We have done this in a number of different cases. The accompanying drawings show how it works in the Sala house in Berkeley. The interior structure of the building is wood post and beam: the exterior wall is a thin-shell concrete structure which ties the building together as a shear-resisting shell enve-



The Sala house, with exterior two-inch concrete shell.



Front wall surface of the Sala house. Precast white terrazo ornament inserted into the poured concrete wall.



Wall section, showing wooden beam, wooden floor, insulation, interior wooden paneling, and thin-shell concrete exterior.



Drawing of the finished Sala house, showing the red and gray stripes that came naturally from the 12-inch lifts of the exterior shell formwork with the use of alternating colors of concrete. Drawn by Stephanie Sala.



Sala house interior with wooden paneling, built-in bench and counter.

lope. The vertical forces come down through the post and beam. The horizontal forces, roughly speaking, are taken up by the very stiff thin concrete tube that is braced against the columns.

In the Sala house, for example, exterior details are concrete, interior details are wood. There are concrete brackets on the exterior, a poured concrete parapet to form the front of the building. These exterior surfaces are inlaid with marble inserts and the pours are made in alter-

nating colors. The interior post-and-beam work include beautiful corbels, cut out of six-by-six fir; these are bolted to columns, and receive the beams. Main beams are six-by-twelve and six-by-eighteen. The floor is two-inch hemlock spanning directly from beam to beam. Again the beams, bays, corbels are chosen in such a way that each structural bay is felt as a center, and so that the corbels themselves are especially beautiful.



6 / HEAVY WOOD CONSTRUCTION

After years of experimenting with concrete, I also began trying to use wood in a way which made more profound sense than stud construction. My first experiments in wood, the Linz café and the Albany house, were nice but fairly simple-minded. We used six-by-six columns

with corbels, beams, wood panelling and wooden ceilings.

In these cases, the field of centers began to exist simply through the structure — because the structural elements — columns and beams — themselves formed centers which supported, am-