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Photographs of a UNICEF School Building Programme in Vietnam (1072 classrooms).

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UNICEF School Building Programme in Vietnam (1072 classrooms).

Photos from the erection of the prototype building
in Hai Phong September-October 1977.

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Architect SAR



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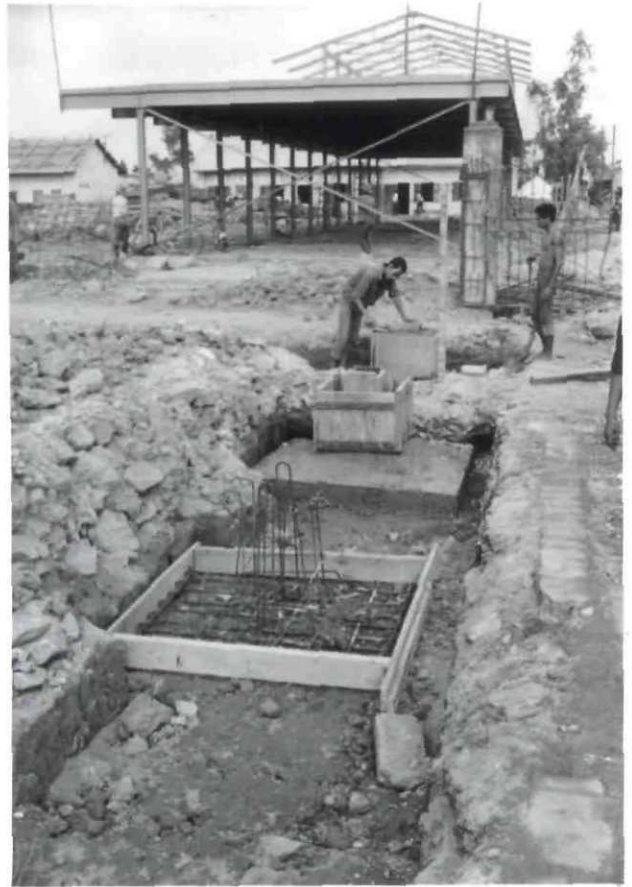
Top: View over the western half of the site taken from the first floor of the prototype building. To the left, the foundation for the second building is being prepared. The one-storey buildings are being used as primary schools. Education is given in three shifts, seven days a week, to overcome the extreme shortage of classrooms in the area. They are planned to be improved later. To the extreme right, behind Mr Orihara and Mr Yamamoto, the ground for the third building at this site can be seen. A temporary, one storey school has just been cleared away since it was damaged beyond repair by the hurricanes last September.

Left: Site plan. The three UNICEF-supported buildings are marked with "1". The prototype is situated bottom right. The point from which the photo above was taken is indicated.





Above and below: Mortar and concrete is mixed by hand. The cement was of local brand - produced just across the road at the Haiphong cement factory. Probably it had been swapped with the cement UNICEF purchased for this project, which was partly delivered early -77 and partly detoured to Ho Chi Minh City (to be sent to Haiphong later).



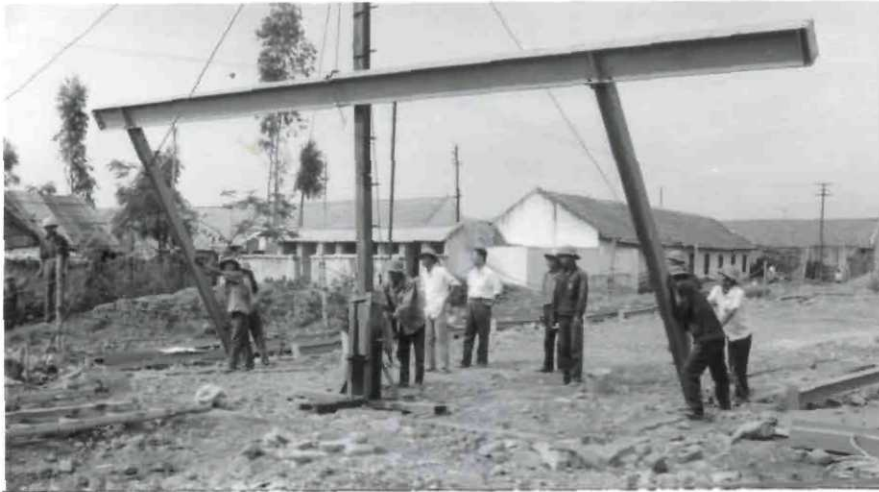
Top: Foundation design: The subsoil is first stabilized 60 - 90 bamboo piles /m², three metres long, and a layer of concrete with crushed bricks as aggregate. The prefabricated reinforcement for pillar foundations is located and bottom slab cast. Form-work for pillar hole is assembled and the hole is cast. Simple and adequate.





Top: The levelling of the foundation[^] was checked. The female engineer had done a good job and the levelling of the bottoms of the pillar-holes[^] were within reasonable tolerances, $\pm 11\text{mm}$, and in a fairly constant slope.

Left: All holes except one were correctly located. The incorrect one was easily enlarged.



Top: The first frame is lifted into place with the help of a short gin-pole.

Middle: The erection procedure was improved compared with the originally foreseen. The whole ground floor was built first, then the first. Thus the gin-pole could be half the size of the one tried in Japan. No units had to be lifted more than one storey.

Left: The structure was ingeniously temporarily staged by using units to be used later. Here, no P8 (roof truss bottom chord), is being bolted to the beam P5A. A small jack is used to adjust the perpendicularity.



Top: The steel deck was installed very quickly. Holes for the first floor pillars were not pre-cut on the ground as originally intended. They were chiseled out on the spot - a good method reducing the risk for errors and gaining time.



Left: The Hilti rivet gun in action. It could however be born in mind for future projects that guns and cartridges are difficult to ship together due to the restriction on explosives. This creates logistic problems at the receiving end why the Hilti method should be avoided. In this case spot welding can be used when available. A better solution might have been to design the structure for locally made pre-fab concrete slabs instead of imported steel deck with concrete topping. Some extra reinforcement bars could be procured instead.

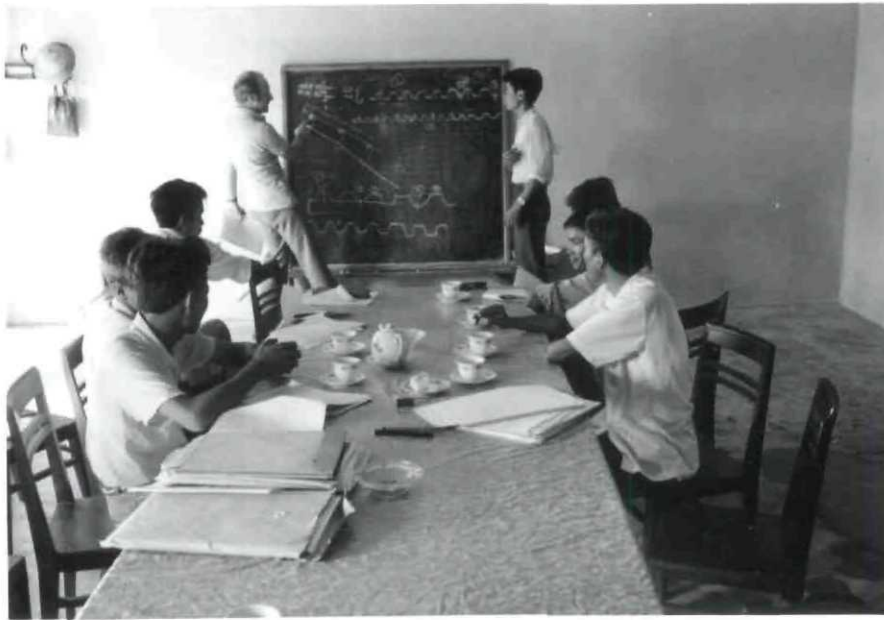


Above. The first frame on first floor was erected with the help of a crane. It could just as well have been done with a ginpole, but the lorry was at hand unloading door crates. In front engineers are discussing the designs.



Above and below: The last frame on first floor lifted by the ginpole and bolted into position.



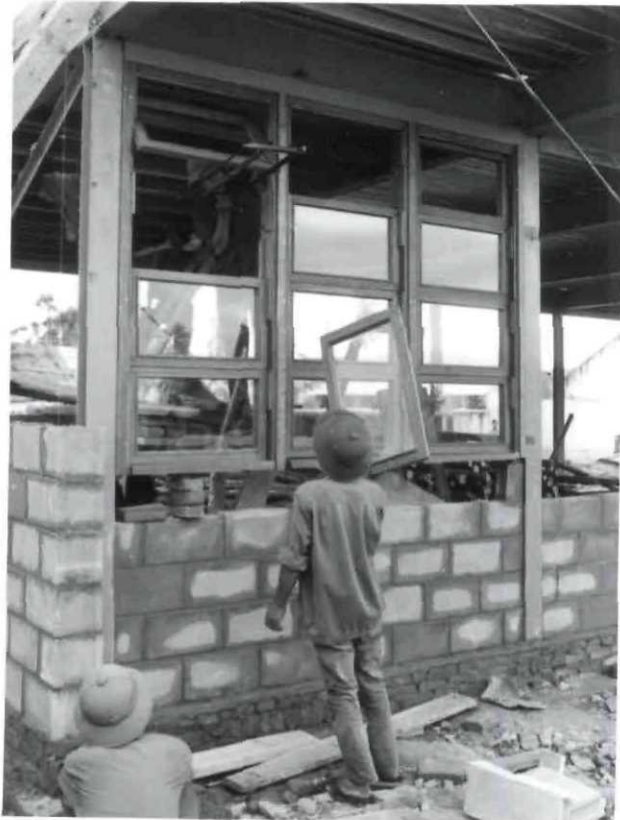


Above: Mr Clarke lecturing about roofing technology. The listeners are responsible Haiphong engineers and to the extreme right mr Dien of Ministry of Education, Hanoi, can be seen.

Below left: Advising on riveting technique. Mr Clarke is using my pop-rivet tool since the Speed-T-Rivet tools provided by UNICEF were not yet available at the site. They had been packed ten in a box for each batch (33/34 buildings). This creates distribution problems. In remote areas, which buildings are not to receive rivet tools? One tool per building would have meant only a minor extra cost and avoided many problems and risks of errors. The Ministry of Education promised however to look into this problem with extra attention.

Below right: The roofing was installed with great speed and very good accuracy.





Top: The doors are heavy and difficult to handle. No threshold is included in the design.

Middle: The joints are crude, sanding and pencilshaving has not been done. A reinforcement bar has to be added at the bottom of the door posts to anchor them into the foundation. If a heavy door like this is slammed, the post must be very strong and well anchored.

Left: The finish of the windows is like the doors. This particular frame had to be adjusted with a saw to close. However if sanding is done locally and varnish applied, they will come out all right. The wood is of high quality.



Top: The ceiling was discussed at length. Here a Haiphong site engineer (left), Mr. Pham Van Don (principal architect for the project) and UNICEF are discussing possible improvements. According to the design the ceiling boards should be screwed from underneath into the purlins. This is difficult to do and could be dangerous. The boards might fall down later. UNICEF suggested that they should be nailed on top of the purlins. This method can be seen illustrated behind the engineer. It was later agreed to change the design this way.

Right: UNICEF also suggested that the purlins were to be turned upside-down. Then the bead suggested by Mr. Hamel fits perfectly into the upward-facing slot at the ends of the purlins (can be seen next to the steel beam).





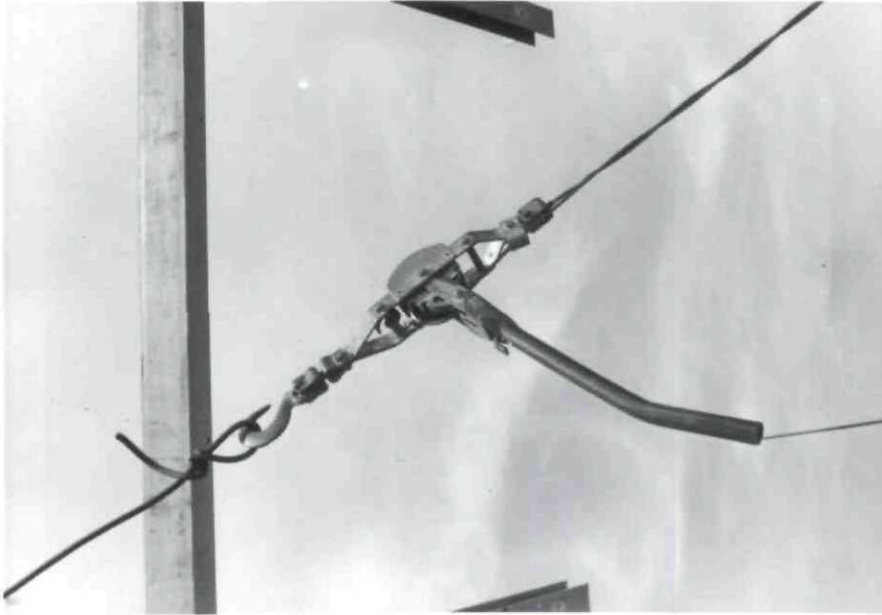
The concrete block machine at work a morning after a night of heavy rains. The concrete is mixed by hand. Due to no gravel and pebbles in the concrete as aggregate the newly made blocks are weak and some break when de-moulded. Once hardened they are perfectly adequate.



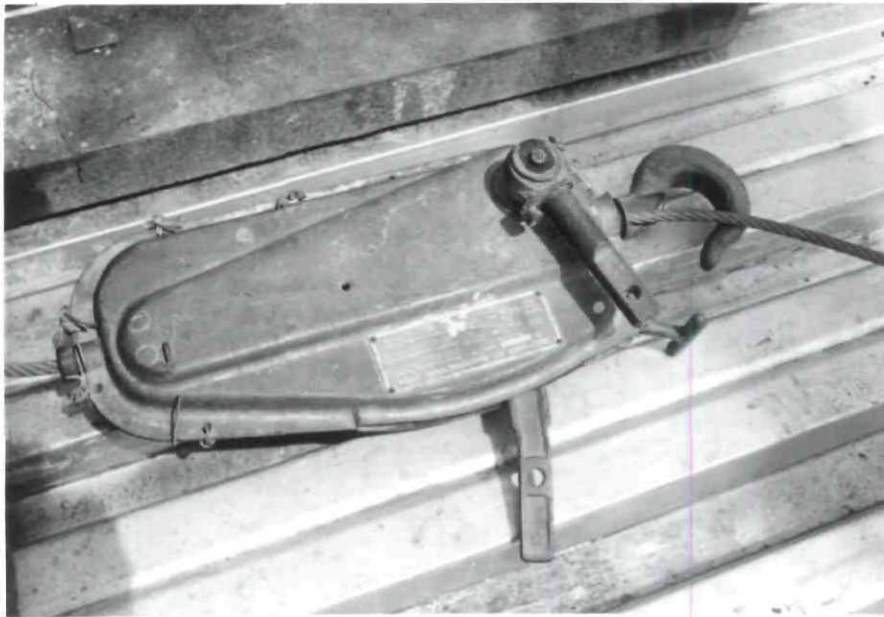
Blocks stored at the prototype site. Good quality!



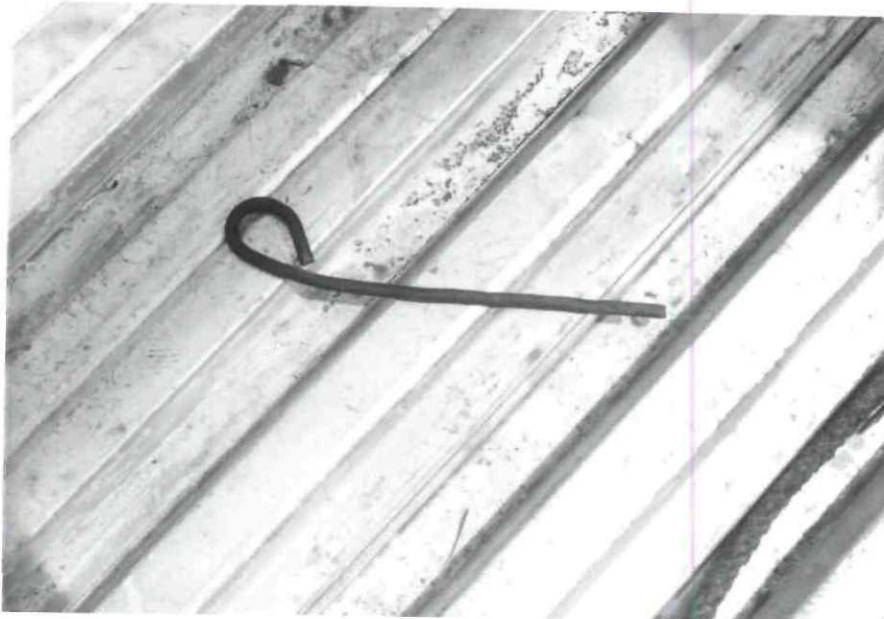
The first block is laid. The masons were very skillful. Note that in the middle of the picture, a special block can be seen. It has an extra slot in the center. It is easy to cut in two and half-blocks are needed at the ends of the wall.



Jack, 1 metric ton.
Very useful.



Jack, 5 metric tons.



"Tapered punch".

Right: The concrete blocks are very useful in Vietnam. The speed of construction is considerably faster than with bricks. UNICEF advocated that the walls should not be plastered but the joints be countersunk a little instead. Thus the wall gives a more lively impression and lime and cement is saved that would otherwise have been wasted in the plaster. The concrete blocks are durable enough (as opposed to the traditional bricks) to withstand rain and wear without plaster.



Left: The steel structure was very accurately made and well assembled. Here 33 metres of balustrade - straight and nice.

Right: The state of the prototype building at the day of UNICEF's departure. Except for the sun-sceen, all major units had been tried and found compatible although some with minor improvements.

