

TECHNICAL SOURCE GUIDE

THE CONCRETE PRAIRIE

By Jeff Taylor, Northwestern College, Orange City, Iowa

Although concrete is commonly used in permanent construction, it is rarely used for theatrical scenery. However, in solving the problems presented to me in our Spring 1993 production of *Quilters*, it appeared to be the perfect solution. The design required a river bed with an 18" high mud bank, a hillock sloping down stage, and another embankment with steps dug out of it. Under normal exterior conditions, sand would be landscaped and a thin Concrete shell would be poured over the top. But within the limits of our theatre facility, this would not be possible.

Five major considerations confronted us: (1) creating contours that were load-bearing; (2) weight; (3) delivery and mixing; (4) removal; and (5) cost. The muddy cut-away embankments with terraces for steps required a construction technique similar to stucco walls. Old plywood touring cases were used for the Principle weight-bearing supports, and plywood contour pieces were screwed on their tops for the uneven edge of the terrace. Over that, 4 mil plastic sheeting was stretched to approximate the steep slope of the embankment, and 1" chicken wire netting was then stapled in place over the sheeting. The chicken wire and plastic sheeting were enough to hold a somewhat dry mix of concrete in place. It proved to be quite sturdy. All concrete used for the embankments and hillock was reinforced with Fibermesh, a chopped fiberglass-like product added during mixing and available at ready-mix plants. We used 1/3 bag of Fibermesh per 74# bag of pure mason's cement.

The hillock had a substructure of platforms and borrowed Styrofoam covered with sand landscaped like a rolling hill. Over this was poured a Covering of 1" thick concrete. The main concern was that the dry sand would trickle through cracks in the Styrofoam or work through the stage/concrete seams and create cavities under the concrete. This was prevented by first completely covering the platforms and Styrofoam hill core with 3 mil polyethylene sheeting, overlapping all the seams. Also, 18" chicken wire netting was added around the perimeter of the hillock where the concrete would be the thinnest. Even with shrinkage cracks, the hillock proved to be extremely stable, capable of many more performances. The Fibermesh Probably gave the concrete the ability to flex a fair amount over the plywood platforming and not crack. We did allow 7 days for curing prior to rehearsal use, because concrete achieves 70% of its maximum strength in the first week.

The stage floor load would have been 20+ tons for our 38' x 14' set if sand was the only substructure. This was far too heavy for our converted church's stage floor, which is rated at 100 lbs./square foot maximum. The solution was to displace most of the sand with 5 conventional 4 x 8 stock platforms, 20 2" x 4' x 8' sheets of Styrofoam borrowed from the local lumber yard, and scrap Styrofoam. This reduced the weight to an evenly distributed maximum of 50 Lbs./level foot. For additional support, posts and beams were added in the basement under the stage.

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The delivery of sand and concrete to the stage could be backbreaking labor, since the theatre floor was 1/2 story above ground level. The skid loader which delivered the sand from the nearby ready-mix plant drove up the front steps and dumped its scoop load outside the front doors on the landing which was at theatre-floor Level. For mixing concrete, a "small" contractor-size cement mixer was winched up the steps and parked on plastic sheeting in front of the stage. Our theatre has movable seating, which made this maneuver possible.

All crew members wore dust masks, and several fans were set up in the auditorium windows, which provided excellent cross-ventilation. Even though the 176 seats were Covered by plastic, they still became quite dusty. however, our cooperative maintenance department vacuumed all seats prior to dress rehearsal. During strike the maintenance department removed seats to the lobby and covered them there. Still, the floors needed about 6 wet moppings.

The dust from mixing bagged cement and the weight caused by people filling the buckets too full with wet cement were also concerns. Rubber gloves were necessary, as latex exam gloves weren't heavy enough. All crew members suffered from badly chapped hands, necessitating the use of hand cream.

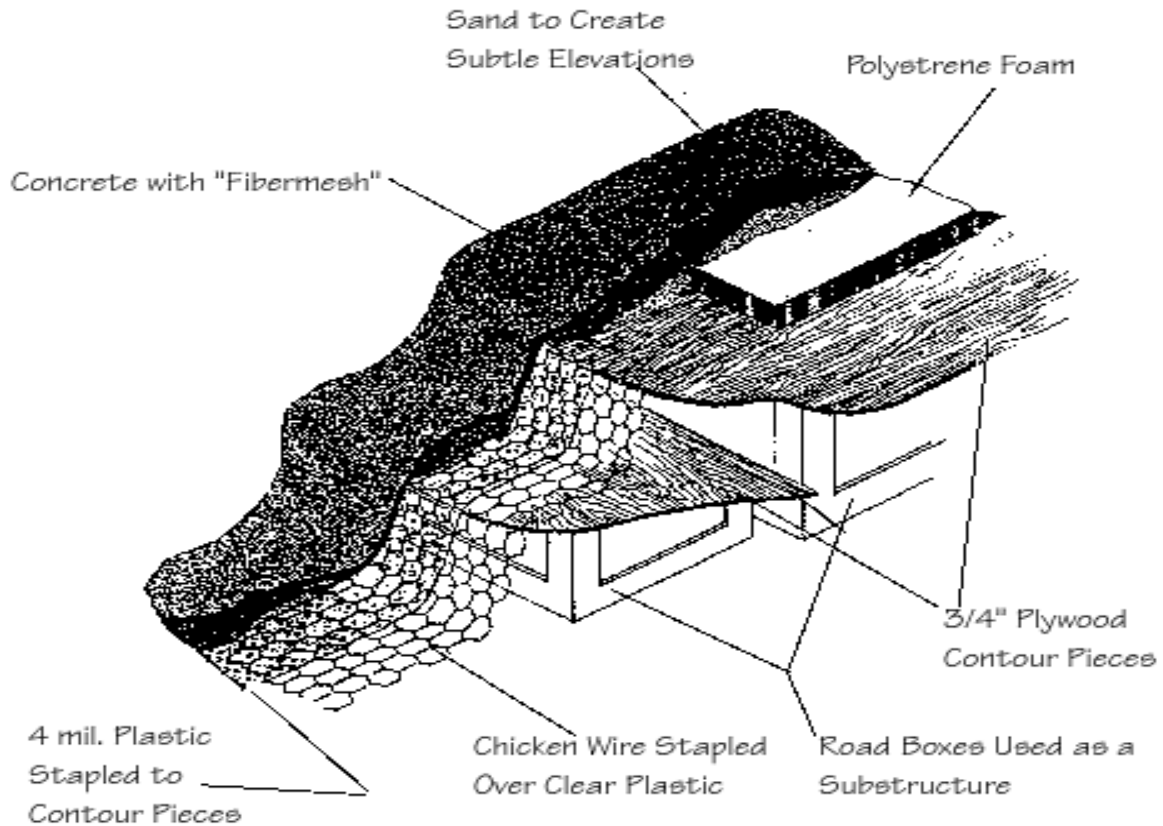
Innumerable jokes were made about getting the city to bring in its jack hammers for strike. but actually, the strike progressed smoothly and quickly. Once an initial hole was chipped in the Concrete, it would crack into pieces when pried up with a heavy iron bar. The disposal of the Concrete was handled again by our helpful ready-mix plant. at no charge. I later learned that some farmer friends could have also used the concrete slabs in muddy areas around their buildings.

The cost of this project was well within even moderate budgets. The local ready-mix company agreed to give us three pickup loads of sand and deliver it without charge. That left the cost of about 17 bags of mason's cement and 6 bags of Fibermesh. Those basic ingredients came to about \$150. Total Cost of the hillock, including mixer rental, was approximately \$220.

As the designer, I was quite pleased with the organic look of the hillock and the crumbly muddy embankments. As the technical director, I was pleased with the way the entire project involved many unskilled Introduction to Theatre students. And of course I was pleased with the high strength and low cost of this concrete prairie.

Thank you for taking time to read this "classic" Technical Source Guide! Because it has been published a relatively long time ago, addresses (physical & web) and any phone numbers, might not be current!

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Concrete Embankments for the Stage

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