

BOCKING WINDMILL, CHURCH STREET, BOCKING, ESSEX

Report on repairs needed to the roof of the roundhouse as at March 2000

The roundhouse of the mill is a circular brick structure with a truncated conical roof of wood. It was designed to protect the timber substructure of the mill, and to provide dry storage. At Bocking there is a floor at crosstree height, and a single pair of millstones which took their drive from a portable steam engine outside.

The roof of the roundhouse is showing signs of distress. The covering of roofing felt is starting to come off in places, and is leaking rainwater into the interior. The underlying boards and their supporting ring purlins are sagging for various reasons, requiring vertical props etc. underneath, which are unsightly and restrict free movement. Although temporary repairs have been carried out in the past, it is, perhaps now necessary to repair the roof properly to ensure long-term protection of the interior.

Specification of repairs to the roundhouse roof.

The scope of the work consists of stripping all the existing felt and boards from the circular framing, repairing or renewing decayed sections of the framing, then re-boarding with thicker boards. The roof is then to be re-felted using a long life roofing felt system.

1. Dismantling.

The dismantling of the roof is to be done in an orderly manner so that original components are not damaged in so doing. The roof boarding and felt covering are to be removed from the circular framing and disposed of. Care must be taken not to cause damage to the framing by levering against it with wrecking bars etc. If necessary, the boards are to be cut away leaving small pieces attached that can be split to remove them. Projecting nails must be removed carefully. It may be necessary to install temporary props to support the framing where it is weak.

2. Soleplate.

The circular soleplate was originally made of elm timber in fairly long lengths, united with loose tenons, and pegged. Some of the soleplate is rotten, and other parts have been replaced with softwood in very short lengths recently.

Allow for renewing 50% of the soleplate in dry elm or ash timber, in lengths not less than six feet. Areas to be renewed are to be agreed on site. The finished section to be 4 ½"X 4", chamfered as originally to carry the boards. Loose tenons of dry elm or ash, 9"X 1" are to be secured with ¾" dry oak pegs, draw-bored to tighten the joints. The new sections are to be treated with a wood preservative before fitting, and when dry, the underside is to be covered with heavy grade bitumen damp proof course felt, attached with galvanised clout nails, and trimmed to shape slightly wider than the plate. The soleplate sections are to be bedded down level on 1:2:9 mortar on top of the wall. This should not be flaunched against the sides of the soleplate, but should just occupy the space underneath.

3. Ring Purlin

The ring purlin is rotten and weak in places. The existing pine supports are few in number and are failing to keep it level.

The ring purlin is to be repaired in a similar way to the soleplate. New sections, of similar length to the existing, are to be made from dry elm or ash timber, and jointed to the original sound sections. Approximately 60% renewal is to be allowed for, the renewed areas being agreed on site. The finished section is to be 3 5/8" X 4", chamfered as existing to carry the boards. Joint detail as for the soleplate. Level up when complete.

In addition to the existing vertical pine supports from the mill quarterbars, four extra supports are to be provided, and nailed to the opposite sides of the quarterbars with flat point cut nails. These supports are to be cut from Douglas fir timber, 5 feet long and 7" X 2 1/4" in section, to be mirror copies of the existing supports.

4. The Top Ring

The top ring is mostly sound, but sagging in places.

The top ring is to be levelled, and may need minor reinforcement in one or two places with stainless steel fishplates, 6mm thick, screwed in place with stainless steel countersunk woodscrews at positions to be agreed. Four extra pine supports are to be provided as for the ring purlin, each 4 feet long, 5" X 2" in Douglas fir.

5. Roof Boards

The roof is to be re-boarded with entirely new boards of joinery quality redwood, pressure-treated against decay by a double vacuum process such as Protim. The boards are to be ripped to taper from treated boards 225mm X 37mm, planed all round, so that one board yields two tapered boards. The boards are to be well fitted and cramped tight before nailing with 75mm galvanised nails. When laying the boards, care must be taken to ensure that the taper is correct, and that the boards lie radially. It may be necessary to correct the taper from time to time to prevent the top or bottom advancing out of step. The boards are to be trimmed flush with the inside of the top ring at the top, and trimmed to have an overhang of 5" beyond the wall at the bottom. The trimming cut at the bottom is to be made vertically, not at right angles to the boards.

6. Felt Roofing

Renew the felt using the Ruberoid Polybit 250 system. Note that the bitumen heating apparatus must be kept well away from the mill building to avoid the possibility of fire, a suitable cover must be kept ready to use on the cauldron, and the LPG cylinder must be 3 metres or more from the burner when in use.

Lay one layer of Ruberglas 120 GP felt, nailed to the boarding with large head galvanised clout nails. Lay a second layer of Ruberoid Polybit 180 High Performance Polyester Elastomeric Sanded Felt, and a third layer of Ruberoid Polybit 250 High Performance Polyester Elastomeric Blue/Grey Mineral Felt. Nail the headlaps with clout nails. All layers are to be fully bonded together with hot Coal Tar Bitumen, grade 115/15. All welts, drips and upstands are to be in the above Blue/Grey Mineral Felt. Drips and welts are to be reinforced with 1/8" oil tempered hardboard e.g. at

eaves, where a fascia 6" deep is to be formed. Drips are to be sandwiched between 2nd and 3rd layers. All side laps are to be a minimum 50mm and all end laps to be minimum 75mm. All side and end laps are to be staggered to layer beneath. The felt is to be carried right up to the top of the roof, underneath the weatherboarded skirt, as before. It may be necessary to increase the clearance between the roof and the skirt to 3" minimum by cutting the boards neatly, and painting the bare wood afterwards.

Report on repairs needed to make the mill capable of turning to face the wind

Bocking Mill has not turned to face the wind for many years. After the War, the framing of the body became weak due to decay of the timbers, and this allowed it to sink relative to the post. The weakness affected the longitudinal members, and these deflected under the weight of the sails, millstones and ladder. Thus the floors now appear to be bowed upwards, with the post at the highest point of the "hill."

In the 1960s, the mill was repaired by a builder, who installed a steel tower inside it to support the weight of the sails etc. This was footed in the roundhouse, and carried on up through the body, supporting the windshaft, and hence the sails. At this time the runner millstones were removed and placed outside, where one remains today.

A later repair in the 1970s was more extensive. The main weak longitudinal timbers, the side girts, were plated on their outsides with strong steel fabrications, and many of the decayed timbers replaced. The body was further stiffened by encasing it in plywood. The upper sections of the steel tower were removed, leaving only the lowest part.

A relatively modest amount of further repair would allow the tower to be removed entirely, leaving the body free to rotate about the post as before. This would free the areas on two floors of the roundhouse currently obstructed by steelwork, and simplify repairs to the roundhouse roof.

Specification of repairs to the mill body, and for removal of the steel tower.

The scope of the work is to reinforce the "sheers" that run fore and aft under the bottom floor of the mill body, using fabricated steel members, at the point where they have cracked through.

. The sheers will also be straightened to some extent, allowing the removal of wooden reinforcement underneath. Some timber joints in the structure are to be reinforced with steel brackets as necessary. The bottom floor of the body is to be completely rebuilt with oak joists and wide pine boards to replace the modern softwood floor. A set of oak "templates" under one crosstree in the roundhouse is to be renewed. The steel tower is to be removed once the structural repairs are complete.

1. The Sheers

The bottom floor of the mill body is to be removed to give access to the top surfaces of the sheers, particularly close to the post where they are cracked. When exposed, the oak planks coach-screwed under them are to be removed, and dirt cleaned out around the post neck. The tie rods passing through the sheers and crowntree are to be removed downwards, cutting their heads off at the top to allow this to be done.

Two fabricated steel channels are to be made to reinforce the sheers where they pass the post. The exact design will be agreed with Mr Pargeter when the floor is removed, but they will be about seven feet long, made from 20mm plate, in the form of an inverted “U” section. One side to be about 6” deep, the other 3” deep, the top being wide enough to fit over the top of each sheer. The shape will have to be slightly cambered to the form the sheer will be when it is the required shape. Each channel will be secured by ten 20mm bolts, nuts and plate washers, and a hole for the tie rod will need to be drilled. All steelwork is to be galvanised.

After fitting, the channels will be used to straighten the sheers somewhat, until they are in contact with the “collar” below them. The old tie-rods are to be repaired, lengthened by about 3”, and provided with large square nuts and plate washers top and bottom. These will then be installed and tightened up

2. Tailpole

The tailpole will need to be hollowed by chiselling out wood where it is very close to the top of the roundhouse roof. This will need to be done before the sheers are straightened. The long bolt suspending the tailpole from the door threshold is to be taken out, repaired, and shortened so that it does not foul the roundhouse roof.

3. Framing joint

The joint between the transverse beam on top of the sheers, and the right front corner post under the bottom floor appears to be coming apart. Allow for fitting a galvanised steel bracket of 125mm x 16mm flat, 12”x 12”, secured by 4 No 16mm galvanised bolts nuts and washers.

4. Templates and trestle joint

The oak “templates” which spread the weight of the crosstree on to the brick pier in the roundhouse that is beneath the sails of the mill are decayed, and need replacing. These must be cut from air-dried oak, 4”and 2” thick, the same width as the existing. The crosstree will need to be jacked up by taking down some of the brickwork of the pier to allow two ten-ton hydraulic jacks to be positioned. Once the weight is taken, the new timber can be slid in. The brickwork is to be repaired when complete.

The joint with the quarterbar is to be reinforced with a 32mm galvanised bolt, nut and washers in a hole bored diagonally through it. The underside of the crosstree will need to have a chiselled recess cut to accommodate the bolt head and washer

5. Steel tower removal etc.

The steel tower is to be dismantled and carted away. The uprights are to be cut off flush at ground floor level, and the concrete floor repaired if necessary.

The existing double channel steelwork connecting the sheers to the lower side girts is to be removed as for the tower. The tie rods attaching the steelwork are to be reinstalled, with dry oak blocks taking the place of the channels, as has been done with the others nearer the doorway.

6. Spout floor

The 16'x 6 ½"x 3" pine ledge, nailed to the right sheer supporting the joists, is to be renewed in oak. This is to be made the same shape as that on the left sheer.

The 14 sets of joists are to be renewed in 4"x 3" air-dried oak, laid so that the floor is as level as possible. They are to be splayed and notched 1" into the lower side girts, and nailed instead of resting on a pine ledge as now. A sack hoist opening, 33" square is to be formed as existing.

The floor is to be boarded using tongued and grooved boards machined to finish at 8 ½" wide and 1" thick. These may be cut from reclaimed Baltic redwood, or new clear Douglas fir. The timber must have a moisture content similar to that of the mill so that it does not shrink or swell when put down. The boards to be cramped together, and fastened with cut clasp nails.

A new double sack trapdoor is to be made from 1 ½" elm, with 1" ledges, hung on leather hinges 3" wide.

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