# Technical Paper

**No. 7**

# THE CHORLEYWOOD BREAD PROCESS

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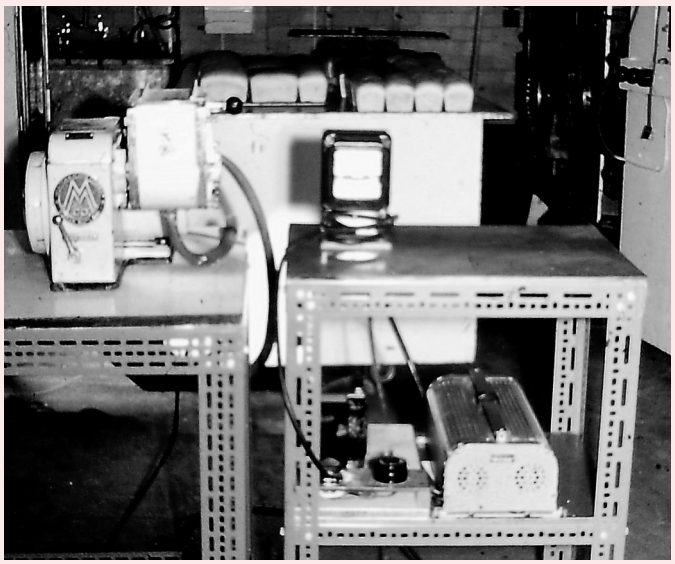
The origins of the Chorleywood Bread Process (CBP) lie with research work carried out in the late 1950's and early 1960's by the British Baking Industries Research Association (BBIRA) based at Chorleywood, Hertfordshire, UK. BBIRA was one of many research associations active in the UK at that time.

The 1950's were a time of great change for the UK baking industry. Typically, two or three hours of bulk fermentation were being used to make bread. There was a lot of interest in the continuous mixing of bread doughs which was seen as a natural progression for plant bakeries, though in many cases with fermentation after mixing. Continuous mixers came to the UK in large numbers, but North American bread characteristics were in sharp contrast with the leaner formula and denser UK bread products and found little favour with UK consumers.

The BBIRA team were actively studying the fundamentals of dough mixing in the test bakery at Chorleywood. As a result of their work they were to show that they could make bread from controlled-energy batch mixing without bulk fermentation, which was identical, or superior in quality (as defined by bread volume, softness and cell structure), to that they made with low speed mixing and bulk fermentation. While working with a variety of mixers the BBIRA team found that though the crumb cell structure varied from one mixer to another, the optimum work input (in terms of bread volume) remained essentially the same. They calculated energy levels in the dough and found that the optimum for the range of flours available at that time was 0.4 h.p. (horse-power) min/lb, equivalent to 5 Wh/lb, 11 Wh/kg or 42 kJ/kg of dough in the mixer.



The significance of the development of the CBP for British Industry was recognised in 1966 with the granting of a Queen's Award to Industry for technical innovation by BBIRA. When launched the CBP was intended for the small baker but quickly plant bakers recognised that the new batch system provided them with a sure way of reconciling raw materials into the plant with baked product coming from it.

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**CBP Fundamentals**

The CBP may be broadly described as "a no-time dough making process which uses mechanical development". The basic principles involved in the production of bread and fermented goods by the CBP remain similar to those as first published:

- Mixing and dough development in a single operation lasting between 2 and 5 minutes to a defined energy input. Originally this was considered to be a fixed value equivalent to 11 Wh/kg or 42 kJkg dough in the mixer though later work has shown that higher energy levels are required for some flours to give optimum results
- The addition of an oxidising agent, now restricted to ascorbic acid in most parts of the world
- The inclusion of a small proportion of a high melting point fat, emulsifier or fat and emulsifier combination.
- The addition of extra water to adjust dough consistency to be comparable with that obtained with doughs produced by bulk fermentation. This extra water yields doughs with similar machinability which can be processed on the same plant as bulk fermented doughs.
- A recipe yeast level sufficient to maintain final proof times comparable with those seen with bulk fermentation doughs. Typically the level of recipe yeast in CBP doughs is higher than that with bulk fermentation because CBP doughs have lower gas levels compared with bulk fermented doughs when they reach the start of proof.
- The control of mixer headspace atmosphere to achieve given bread cell structures. When the CBP was first introduced this was restricted to the application of partial vacuum for the whole or part of the mixing cycle but more recently this has been extended to include pressures greater and lower than atmospheric, and sequential changes during the mixing cycle (see below).

*Benefits from using the CBP include:*

- A reduction in total processing time by at least the fermentation time of the dough in bulk.
- Space savings from the elimination of the need to keep bowls of dough at different stages of bulk fermentation.
- A reduction in the need for temperature-controlled areas for the dough production.
- Improved process control and reduced wastage in the event of plant breakdowns because there will be less dough at an intermediate processing stage.
- More consistent dough and final product quality arising from the reduced variability in dough piece weights coming from the divider.
- Financial savings from higher dough yield through the addition of extra water and retention of flour solids normally fermented away.