

Blow Moulding Controls Ltd.

Parison Programming Course

The following information describes the main points covered during our one day parison programming training course.

We modify the course content according to the type of machines and products that your company produces.

For example, accumulator head and reciprocating screw machines are not covered in courses given to companies that only produce bottles on continuous extrusion machines.

The difficulties of achieving good wall thickness distribution on technical mouldings is covered because packaging designers have been known to design highly contoured containers that can require a knowledge of advanced parison programming techniques.

We keep the theory part of the course to a minimum because we find that most course attendees prefer us to place particular emphasis on fault finding.

Practical sessions include the stripping of a Moog valve, the examination of a wide range of mouldings, and open discussions on the problems engineers typically encounter.

We will also go through the calibration procedure on our machine simulator, or if the course is held at your factory, then we try to obtain some machine time. Because we like to show the effects of common faults we prefer to hold the courses at our factory where we have a range of demonstration facilities.

We are always trying to improve the content of our courses, and you will see in the following information that a number of new subjects are covered.

We welcome any suggestions on how we can make our courses even more effective, and if you feel that we have omitted anything please let us know.

As a final comment, we are proud to say that we do not use our courses to directly promote the sale of our products. We would however ask you to consider the effort we put into organizing these courses in comparison to the courses offered by our competitors. It is our belief that training, spare parts stock, and service engineer availability should also be considered along with the price of a product.

Note to attendees of this course: You will be asked to comment on the presentation, quality of visual aids, comprehensiveness of the hand out notes, the usefulness of each subject, and clarity of the presentation . . . phew ! Listed below are the 80 +subjects to be covered.

1. **Introduction to Blow Moulding Controls.**

- a) People
- b) Products
- c) Service policy

2. **What is “Parison Programming” and why we need it**

- a) Eliminating the effects of parison stretch
- b) Reducing thick areas to reduce cooling time
- c) Maintaining minimum thickness in critical areas
- d) Achieving drop test and other specifications
- e) Special considerations for programming Polypropylene (PP), Polyethylene Terephthalate (PET), Low Density Polyethylene (LDPE), Polyamide (Nylon PA)

3. **Analyze a range of containers**

- a) Why good wall thickness control is essential for saving material and cycle time
- b) Examples of a wide range of packaging, technical, and “novel” mouldings will be examined and typical problems discussed
- c) Discuss any “problem” mouldings produced at trainees factory

4. **Closed Loop Servo-control theory**

- a) What “closed loop” means
- b) Measuring system accuracy
- c) Methods to improve repeatability
- d) The real meaning of the word “Gain”
- e) The difference between no feedback and positive feedback
- f) What causes weight drift

5. The components of a parison programming system:

Hydraulic supply:

- a) Pressure, return and off-line filtration methods
- b) Retrofitting extra filtration to improve machine reliability
- c) How to compare the efficiency of different makes of filters
- d) Why a good supply of oil pressure is essential
- e) Accumulator pre-charge pressure recommendations
- f) Interpreting oil sample analysis reports
- g) How to reduce working pressure to save energy
- h) Problems when the main hydraulics supply the servovalve
- i) Why temperature is the biggest cause of servovalve failures

Hydraulic cylinder:

- a) Why piston rod seals fail too frequently and what can be done to eliminate the problem
- b) Forces acting on the cylinder and head tooling
- c) Why you should not replace the piston head seals
- d) What is integrated electronics and what can be adjusted
- e) Setting the minimum die gap mechanically

Position transducer (LVDT)

- a) How the transducer works
- b) A simple method to test that an LVDT is working properly
- c) Why some cylinder designs cause the LVDT to fail
- d) Setting the transducer correctly
- e) The difference between various types of LVDT

Servovalve

- a) How a servovalve works
- b) Differences between Moog, Rexroth, and Hunkar servovalves
- c) Setting the null adjustment correctly
- d) Compatibility between different valves and flow rates
- e) Importance of not mixing flow rates
- f) What you can and can't do to make a faulty valve work
- g) Common causes of failure and how to avoid them
- h) Difference between servo and proportional valves
- i) Why servovalves are dirt sensitive despite makers claims
- j) New information on flushing procedures

Parison programming controller

What the Range, Weight and Slider controls really do
and their relationship to each other

- b) Four main Interpolation methods, and why you might want to change them
- c) How to calibrate the minimum, maximum and gain trimmer potentiometers
- d) Calibrating the different types of Moog servo amplifier
- e) Why non-standard calibration is necessary for some containers
- f) Why you should use a standard method of calibration
- g) How to set up the programmer settings on a new job
- h) Difference in start signals between Bekum and other machines
- i) Important differences between Moog, Hunkar, Bekum, and "Total machine control" type programmers
- j) When to switch from Linear to Curve-linear interpolation
- k) What the electronic cards in the rack are for
- l) What pre-set adjustments you should never adjust

6. **Parison Length Controls**

- a) Principle of operation
- b) Setting up a new job
- c) Importance of setting the photocell correctly
- d) Making a manual adjustment to parison length
- e) Comparison of Bekum, Battenfeld-Fisher and Moog PLC's
- f) Typical problems
- g) Why PLC's are important for consistent production
- h) Effect of regrind / virgin percentage on parison length

7. **Common Faults**

- a) Servovalve inoperative
- b) Cables melted or damaged
- c) Wires in valve or transducer plug broken
- d) Pipes to servovalve connected the wrong way
- e) Servovalve mounted the wrong way
- f) Feedback polarity incorrect
- g) Accumulator pre-charge pressure low
- h) Servo amplifier card miss-adjusted
- i) LVDT rod missing

8. Preventative Maintenance

- a) Check plug and cables to Servovalve and LVDT
- b) Examine Servovalve pilot filter
- c) Examine main pressure filter that feeds the servovalve
- d) Check tightness of the LVDT rod nuts
- e) Check tightness to LVDT bracket and anti rotation nut
- f) Measure mains voltage to Programmer unit
- g) Measure “null bias” of the servovalve
- h) Consider fitting supplementary filtration.
- i) What spare parts you should hold for maintenance and emergencies

9. Eight step method of FAST fault finding

- a) Establish if the fault is genuine or “man made”
- b) Using the servovalve test box
- c) What to look for after a head change
- d) The “binary chop” method of logical fault tracing
- e) How adjusting the minimum die gap pot can help find faults
- f) Understanding the test point readings
- g) Dangers in swapping cards from other machines
- h) Don’t waste time chasing “pet” theories or “red herrings”

10. Special features and modifications

- a) Calibration of Multi-Head machines fitted with separate cylinders
- b) Starting the programmer from different machine signals
- c) Synchronizing machine sequences with the parison programmer
- d) Non-standard calibration for difficult mouldings