

'The Fundamentals of Papermaking'

An Introduction to the Operator Development Program

OVERVIEW

- This 2.5 day course provides a fast track introduction to papermaking (limited to operations between 'Mixing Chest' & 'Reel Up'). The intention is to raise the knowledge of process, technician & support staff to an intermediate level of shared understanding regarding modern Paper Machine operations.
- In addition to being valid as a standalone course, the course content also provides an introduction to the '**Operator Development Program**' (ODP).
- **Papierzentrum in Gernsbach** also provides a bridge between the UK & German Training & Education systems.

Target Audience:

Machine operators, wet end operators, shift supervisors & trainees.

Running a paper production facility efficiently today, requires excellent know how from people involved in the process. This course will give participants up to date knowledge concerning all relevant processes involved. The course contents include:

- Machinery,
- Paper Chemistry, &
- The interaction of other production areas, including their impact on product, quality & Machine runnability.

Course Fees¹:

- Course Fees, including full course documentation & refreshments £ XXX (plus Tax)
- Travel & Accommodation to be organised by the participant
- All Courses are subject to a 'Minimum Attendance Level' & delegates should avoid making non-refundable travel arrangements until their place on the Course has been confirmed.
- Substitutions of Attendee may be made at any time.
- Cancellations made less than 14 days prior to the course date, or failure to appear, will result in forfeiture of the Course Fee.

¹ Note:

Cancellation Policy

- Substitutions of Attendee may be made at any time.
- Cancellations made less than 14 days prior to the course date, or failure to appear, will result in forfeiture of the Course Fee.
- All Courses are subject to a 'Minimum Attendance Level' & delegates should avoid making non-refundable travel arrangements until their place on the Course has been confirmed.

Day 1

- Introduction to the Industry
 - Overview to the pulp, paper & packaging industry
 - Main figures of the national & international productions
 - Raw material & resource development
 - Changes in the raw materials, energy & production in the past
 - Paper technology in the future, main barriers & challenges
- Stock Approach Flow
 - Feed flow into the Stock Approach System
 - Stock approach system as a black box: which components are added & removed in the stock approach system & what is their influence on the paper making process.
 - Which parameters can be used for controlling the feed flows into the stock approach system
 - Effects of changes in the feed flows into the stock approach flow processing, overview
 - Stock & water loops
 - Stock flows & main parameters in the stock approach system
 - Water circulation & its effect on the runnability & quality, overview
 - Machinery & build-up
 - Machineries used in the stock approach system & goals of them
 - Water circulation & its effect on the runnability, wet end chemistry & quality
 - Impact on quality & runnability
 - The influence on the stock & paper quality in the stock approach system.
 - Typical runnability & quality problems related to wet end
- Head box
 - Distribution systems
 - Cross flow header/tapered header & central distributor differences & functions
 - Pulsation elimination tank
 - Design & types
 - Head box types limited to open, pressurised & hydraulic head boxes
 - Distribution channels, stock dilution system, mixing chamber, turbulence generator & lamellas
 - Efflux ratio
 - Control & adjustment of efflux ratio
 - Effect of the efflux ratio on the paper quality (fibre orientation & formation)
 - Turbulence generation
 - Different techniques for turbulence generation e.g. rectifier rolls & tube banks
 - Influence of the turbulence generation on the formation, paper quality & dewatering
 - Differences between macro & micro turbulences
 - The 'Slice'
 - Functions of the slice
 - Adjustment of the slice & its influence on the stock flow, paper quality & dewatering.
 - Velocity forming vs. pressure forming
 - Impact on paper machine runnability & product quality
 - Adjustments of the head box & their effect on the paper machine runnability & the paper quality
- Chemical additives in the wet end
 - Chemicals to enhance product quality
 - Use of chemicals for improvement of e.g. strength or colour
 - Dosage of chemicals: influences on the production
 - Chemicals for runnability improvement
 - Addition of retention aids, defoaming/de-aerators or bentonite & their influence on runnability
 - Introduction into fibre & wet end chemistry
 - Fundamentals of fibre chemistry: hydrogen bondages & reactive groups
 - Chemical fundamentals of wet end chemicals, which requirements exist for the use of wet end chemicals

Day 2

- Forming section
 - Single & multi-layer designs
 - Principles of different forming sections for different paper grades
 - Sheet forming fundamentals
 - Dewatering & concentration of particles through the forming section
 - Two-sidedness & its influence on the quality
 - Dewatering elements & vacuum system
 - Design of the dewatering elements e.g. foils, forming roll, forming table, suction boxes... & their influence on the dewatering & paper quality
 - Pressure impulses & their adjustment to improve the paper quality & runnability
 - Retention
 - First pass & total retention, ash retention & influence on the productivity & quality
 - Impact on product quality & runnability
 - Wire section impacts on the paper machine runnability & the stock & water loops
 - Fabric considerations
 - Forming fabric fundamentals

- The Press Section
 - Press section designs
 - Different press section designs e.g. 3 nip system, 3+1 nip or shoe press system & their influence on the runnability & quality
 - Fundamentals of pressing
 - Physics of pressing & dewatering in pressing section
 - Parameters effecting the pressing result
 - Press nips: grooved, blind drilled, shoe press
 - Press cylinder designs & dewatering principles of them
 - Press section impact on product quality & runnability
 - Press section adjustments & their impact on the paper quality & runnability of the paper machine
 - Press felts & conditioning
 - Fundamentals of press felts

- The Dryer Section
 - Fundamental of paper & board drying
 - Dewatering of bound water & fundamentals of paper drying
 - Paper grades & their impact on the drying result & steam consumption
 - Build-up of dryer groups single/double tier
 - Most typical cylinder drying systems & their differences
 - Water removal from the paper & hood in drying section for different systems
 - The Drying Cylinder
 - Construction of a drying cylinder & principle of heat transfer
 - Steam & condensate systems
 - Fundamentals of a steam-condensate system
 - Units & their principles in a steam-condensate system
 - Pocket Ventilation
 - Importance of pocket ventilation
 - Dew point & 0-level
 - Fundamentals of dew point & 0-level in a drying section
 - Influence on the steam consumption & paper quality
 - Dryer Section Operations
 - Drying section adjustments
 - The Dryer Fabric & cleaning
 - Fundamentals of dryer fabrics
 - Cleaning systems for dryer fabrics

- Finishing
 - Online-Calendering fundamentals
 - **Calendering effects on the paper quality**
 - **Parameters for adjusting calendering results**
- Reel Up Systems
 - **Reeling up systems & their function**

Day 3

- Introduction to Process Control
 - Computer Aided Process Simulation
 - **“From mixing chest to reel-up”**
 - **Start-up the paper machine**
 - **Working with closed control loops**
 - **Adjust various machine parameters to improve product quality**
- Course Closure & Review