

Modular Inspection Training

Level 1: Operator training, duration **0.5 days** (Module 01 – 05)

Level 2: Inspection **expert** training, duration **3 days** (Module 01 – 10)

Level 3: **Optional extensions** for in-depth knowledge (Module 11 and 12)

Module	Description	Audience (*)		
		O	M	E
01	Inspection intro and system information	X	X	X
02	Viewing live results; inspection process workflow	X	(X)	X
03	Reviewing inspection results; using a defect library	X	(X)	X
04	Safety, maintenance and troubleshooting	(X)	X	(X)
05	System menu; backup strategy		(X)	X
06	Advanced settings to customize your live views			X
07	Advanced database actions and reports			X
08	Creating new recipes for detection and qualification			X
09	Classification; principles and optimization			X
10	Questions and answers; training assessment			X
11	Customer specific lessons for optional settings			X
12	Apply your knowledge guided by a trainer (on-line)			X

* **O:** Operators, user of the inspection system on the production line

M: Service and maintenance staff, first level support

E: Inspection experts, quality engineers, shift leaders, staff responsible for inspection recipes



LEVEL 1: STANDARD USER TRAINING (MODULE 01 – 05)

The **standard user training** concentrates on usage and maintenance of the inspection system to ensure reliable performance. **Necessary fundamentals** for monitoring and evaluation of results as well as basic knowledge mandatory for the inspection expert training (level 2) are transferred.

Module 1: Inspection intro and system information

Duration: 1 hour

- Goals
- Why do we need inspection systems?
 - How does your inspection system work?

Topic	Content
Your system configuration	Details of your inspection system setup
System setup Optical channel(s)	Basic system knowledge, line scan camera principle Optical channels - MIDA principle What can the different channels detect?

Module 2: Viewing live results, inspection process workflow

Duration: 2 hours

- Targets:
- What does the “Visualization” display?
 - Displaying the live results for quality - and process control
 - Adjusting your inspection according to your production workflow

Topic	Content
Material quality information “Visualization”	Show defect classes and severities for quality control Show homogeneity for process and quality control How to use statistics
Operator tasks System information	Performing roll changes and job changes Viewing system status, Warnings and Alarms
Operator settings	Automating the inspection system, operation modes, different display options



Module 3: Reviewing inspection results, using a defect library

Duration: 1 hour

- Goals:
- Loading data from the database using the “PHC” software
 - Defect library and classification model creation

Topic	Content
Roll and sheet inspection data using “PHC”	Finding and loading data from the database Using your database views with the PHC software
Defect library and classification model creation	How to drop defect examples in a defect library to create a classification model

Module 4: Safety, maintenance and troubleshooting

Duration: 1 hour

- Goals:
- General safety information
 - Explanation of the necessary maintenance work and intervals
 - Reasons for warnings and alarms - troubleshooting

Topic	Content
Safety information	General safety information for machinery and LEDs
Inspection system hardware	Review of mechanics and electronics Chiller, electronic cabinets and illumination units
Regular maintenance	Recommended maintenance work Spare parts
Details on inspection system software	Using the maintenance software tools for troubleshooting

Module 5: System menu, backup strategy

Duration: 0.5 hour

Goals:

- Find suitable backup strategies
- Adjust network and database configurations

Topic	Content
Backup strategy	Creation of configuration, application and system backups
Dr. Schenk Linux menu	General system menu settings

LEVEL 2: INSPECTION EXPERT TRAINING (MODULE 01 – 10)

The **expert training** focuses on creating new recipes and optimizing the recipe settings and classification. All expert settings e.g. adjusting the views, adapting the system parameters and all fundamentals of a recipe are discussed. Besides the theory, a training recipe is created. General duration is 3 days.

Module 6: Advanced settings to customize your live views

Duration: 3 hours

Goals:

- Get to know “Visualization” details through practical training
- Adjust “Visualization” for quality control and process control

Topic	Content
Setting views in “Visualization”	Adjusting all relevant display settings How to use and adapt statistics
User views and defect information	Customization of “User Views” Detailed defect size measurement and defect evaluation
Inspection system parameters	Adjusting general color settings in “Visualization” Labeling and renaming of defect results and defect information



Module 7: Advanced database actions (PHC) and reports

Duration: 3 hours

- Goals:
- Configuring your database views for quality control and process control
 - Creating different reports

Topic	Content
Inspection system database	SQL database, archive- , cloud- and twin database What is stored in the database and what can be reviewed? User management (User Access Level)
Roll- and sheet inspection views	Configure your views in PHC software Focus on individual settings for viewing inspection results
Inspection reports	Creating your individual report in pdf, html, csv

Module 8: Creating new recipes for detection and qualification

Duration: 6 hours

- Goals:
- Optimizing your existing recipes
 - Creating new basic recipes for new products

Topic	Content
Detection	Optimizing light settings and camera settings Setting detection thresholds, signal processing Range manger settings
Filter Defect triggered actions	Filter settings Storing of defects in a database, marker- and view settings
Qualification	Assigning defect severity levels Implementing your quality specification for your material

Module 9: Classification, principles and optimization

Duration: 6 hours

- Goals:
- Classifying a detected defect
 - Working with a defect library
 - Different possibilities to create classification models (AI and rule based)

Topic	Content
Local defect classification	Generating automatic defect classification models Using AI for model generation, deep learning principle Semantic segmentation and Convolutional Neural Network
Classification optimization	Collecting defects in a “Defect Library” Using “Confidence Limit” in classification Judging the quality of the “Defect Library”
Creating defect classes	Defect class specification, symbol, color Using the defect classes “Ignore” and “Unspecified”

Module 10: Questions and answers, training assessment

Duration: 2 hours

- Goals:
- Answering remaining questions
 - Reviewing your knowledge about inspection systems

Topic	Content
Questions and answers	Discussion of remaining questions
Course review Training assessment	Review of inspection system knowledge Evaluation of the training course



LEVEL 3: OPTIONAL EXTENSIONS FOR IN-DEPTH KNOWLEDGE

Precondition: Level 2 training certificate

Module 11: Customer specific lessons for optional settings

Duration: 2 - 4 hours per topic

Goals:

- Getting to know the possibilities of your customer-specific function

Topic	Content
Video Measurements	Setting user videos and user filter. Setting up used defined edge inspection for lane tracking or edge detection.
Streak detection	Setting the low-contrast streak detection using the streak detector module.
Advanced sheet layout	Create advanced inspection layouts for printings, barcodes, tell tales, etc.
EasyMeasure	Configuring homogeneity maps to monitor different properties of the material.
MIDA X	Additional segmentation using image processing for improved classification and its application to classification.
Advanced classification	Multi step classification Usage of optional pre- and post-classification.
Period defect detection	Assigning defect to periodical occurring defects caused by e.g. roller defects.

Online Module 12: Apply your knowledge guided by a trainer

Duration: 2 - 4 hours per session

Goals:

- Clarify arising questions on your onsite inspection system settings
- Transfer your training knowledge to your onsite inspection tasks
- Online support for fine adjustment of your inspection system recipes

Training language

Dr. Schenk training courses are typically conducted in English, German or Chinese. Depending on availability, additional language requirements can be accommodated upon request.

Training documentation

Participants of the individual and expert training classes receive a personal training documentation kit as a printout or as a download link. The Dr. Schenk training material contains all training handouts and an additional training CD-R or a download link for presentations and system manuals.

Course information

All modules include practical training on appropriate inspection systems, e.g. demo systems or customer systems.

Certificate of participation

Participants of the individual and expert training classes receive a personalized certificate of participation.

Preconditions for onsite training

The inspection system must be ready for operation. Meeting room with video projector and network connection to the inspection system must be available. Remote client i4.viz must be installed.

For further information or questions

Please contact Dr. Schenk at

www.drschenk.com