User Manual – PC Version

Defect

Animation

Tool

Causes and Remedies Compendium

Version 1.0, July 2013

Content

1 Introduction

Welcome to the IPGR Defect Animation Tool (DAT), an easy-to-use computer animated Causes and Remedies Compendium.

The goal of this tool is to allow easy operator training, especially when training new employees as IS machine operators and to provide a compendium for defect avoidance strategies. The tool was generated together with the IPGR member companies during a period of three years and has been now made available for the glass-container industry.

This Glass-Container Defect Animation is an illustration of common defects that can occur during glass container manufacturing. The intention of the tool is to provide an updated alternative to the known “causes & remedies” books with computer animations on how a respective defect is generated and how it can be avoided.

Like all available causes and remedies books, the DAT does neither claim completeness nor absolute correctness. It certainly has been engineered and revised with utmost care to assure a high quality and high completeness of information.

Nevertheless, IPGR does not take responsibility on the correctness and completeness of the data. The implementation of any remedy from the DAT into practice is on the sole responsibility of the company or person who uses the DAT. IPGR does not take any liability on yield loss or any other damage that might occur as a consequence of the usage of the DAT.

The DAT is constructed as an open database. This means additional defects can be implemented and the tool can be expanded. These expansions will be available with future versions.

2 General Description

The program is intended to simplify operator training (especially for new employees) and is widely used in IPGR member companies for education and on the machine floor as compendium. Structure and details of this program are different to the common known books. In difference to “Causes and Remedies”-books, this program provides *text and animations* on how defects are generated and how they can be avoided.

The program provides descriptions on:

1. How a certain defect is made *in general*
2. How a certain defect can be avoided *in general*
3. What are *specific* causes for a certain defect and what are *specific* remedies to avoid this defect

Currently over 60 defects are implemented. On purpose, defects and their generations are exaggerated and often slowed down in the animations to make them clearly visible. In real work-life, the defects can be smaller and more difficult to observe and processes can be faster.

As defect origin might be different for the three different forming processes, namely Narrow-Neck Press & Blow (NNPB), Blow & Blow (BB) and Press & Blow (PB), for each forming process the defects are listed separately. Furthermore, as not all defects occur in all processes, there might be some defects not listed in all three processes.

It has to be mentioned that the same container defects might have different names in different countries or sometimes even in different plants in the same country, for example “Rocker”, “Uneven bottom” or “Rock-bottom” for a container which does not stand evenly on a surface because of a bottom that has sacked down. The names given to the defects in this tool are the names which IPGR internally has agreed upon. There might be variations to the defects names at other companies or other countries.

The DAT is available in a Flash version and a HTML-5 version. There are different advantages of both systems. For details please contact your IT administration staff.

3 Implemented Defects

Location	Defect
Finish	Blown back finish / hollow finish
Finish	Broken finish
Finish	Bulged finish
Finish	Check under finish
Finish	Checked bead
Finish	Checked finish
Finish	Crizzled finish
Finish	Flanged finish
Finish	Inside finish check
Finish	Line over finish
Finish	Neck ring seam
Finish	Offset finish
Finish	Out of round finish
Finish	Overpress
Finish	Rolled in finish
Finish	Saddle finish
Finish	Split finish
Finish	Tilted finish
Finish	Unfilled finish
Neck	Bent neck
Neck	Choked neck
Neck	Pinched neck
Neck	Seam on neck ring parting

Location	Defect
Shoulder	Danny Check
Shoulder	Light shoulder
Shoulder	Shoulder check
Shoulder	Sunken shoulder
Body	Bird swing
Body	Blank mold seam
Body	Blow mold seam
Body	Body mark
Body	Bruise check
Body	Bulged side
Body	Cold appearance
Body	Hot panel check
Body	Lap marks
Body	Leaner
Body	Out of roundness
Body	Plunger mark
Body	Pressure check
Body	Settle wave
Body	Sunken side
Body	Washboards

Location	Defect
Base	Baffle mark
Base	Flanged bottom
Base	Heavy bottom
Base	Heel check
Base	Knurling check
Base	Rocker bottom
Base	Shear marks
Base	Swung baffle
Base	Thin bottom
Base	Wedge bottom
Others	Black specks
Others	Blister
Others	Broken ware
Others	Centering and engraving checks
Others	Dirty ware
Others	Out of height
Others	Spikes
Others	Stuck glass particle
Others	Uneven distribution

4 Structure and usage of the program

The DAT is structures mainly in six screens.

1. Login Screen
2. Defect and Process Selection screen
3. Specific defect screen “How the defect is made”
4. Specific defect screen “How to avoid the defect”
5. Specific defect screen “How to avoid the defect” “Operational Solutions”
6. Specific defect screen “How to avoid the defect” “Design Engineering”

4.1 Login Screen

If you do not have a license with auto log-in (static IP or software dongle based), after accessing the DAT you will enter the login-screen (Figure 1) and you will be requested to enter your user login and your password. After doing so, by pressing <*Login*> you will be directed to the main page of the DAT.

At the login screen and later in the program you can also select a language for the DAT via a drop-down menu in the upper screen. The default language is English; translation-option to other languages is optionally available.

Figure 1: Login Screen

Where applicable, at each subsequent screen a log-out button logout will appear in the upper right corner which allows you to properly log-out of the DAT.

4.2 Screen “Defect and Process Selection”

After login (or auto-login if applicable) you are directed to the “Defect and Process Selection” screen (Figure 2).

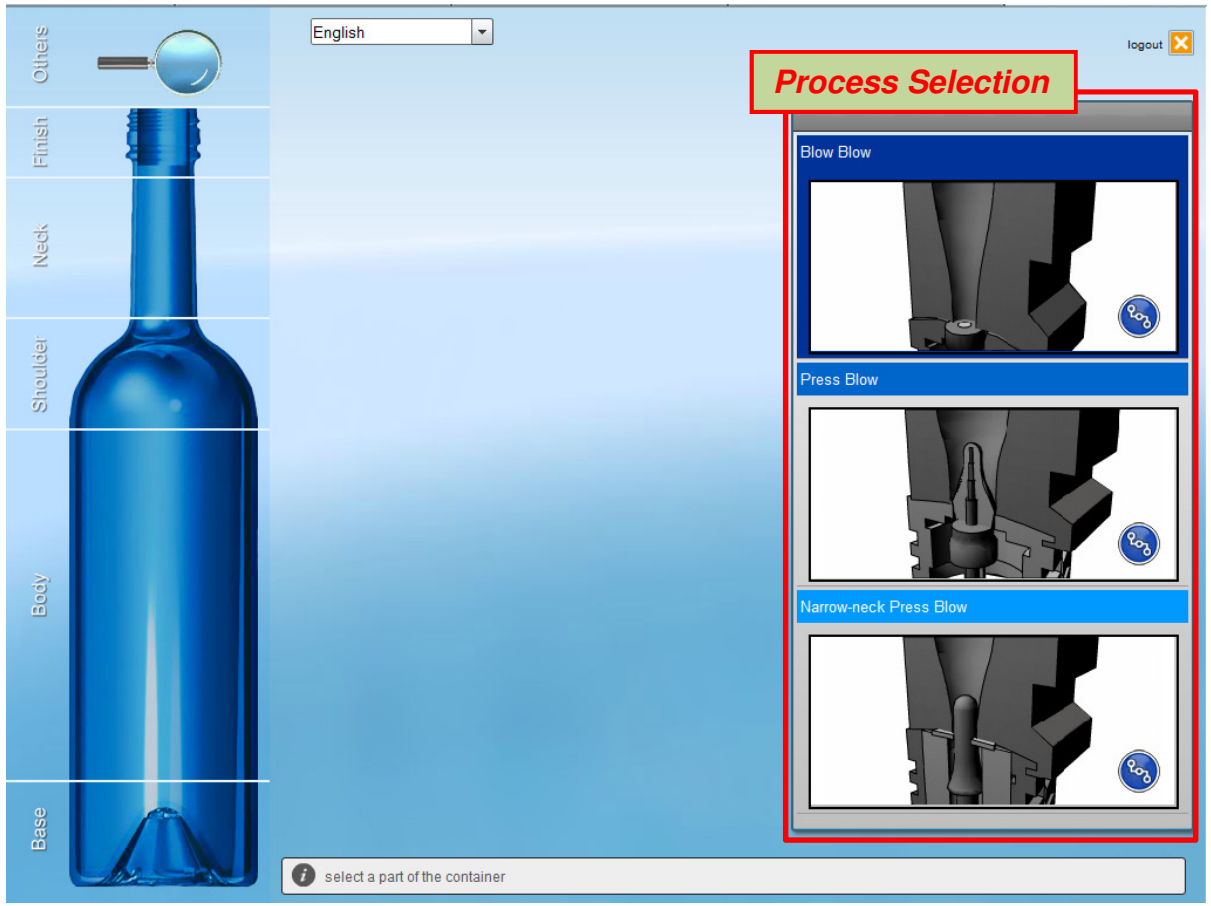

Figure 2: Defect and Process Selection Screen

In the area *"Process Selection"* you can chose the process you want to investigate by clicking on the respective process window on the right hand side of the screen. The container on the left hand side will change color according to the selected process. Available are

- Blow & Blow (BB) (dark blue)
- Press & Blow (PB) (blue)
- Narrow-Neck Press & Blow (NNPB) (light blue)

By clicking on the  icon in the lower right corner of each process you get a process overview of a complete container forming cycle (Figure 3). To avoid distractions due to too much details, one section with a single gob is shown in the process.

If you move your mouse pointer across the process overview delineation, below this overview a *player bar* will appear with a play/pause button as well as a time bar with run-time indicator and a full-screen button on the right side of the player bar (not available in Flash version). Now you can view the selected container forming cycle by clicking on the play button on the left side of the player bar. The animation can be paused at any time by clicking on the play/pause button in the player bar. The animation can also be set to a specific position by moving the time indicator on the play bar to a desired position of the animation. Animations can be replayed as often as it is desired.

There is a *speed button* in the upper left corner of the IS machine delineation. By clicking this button, the speed of the animation can be changed in the following sequence: 1 x → ¾ x → ½ x → ¼ x → 1 x

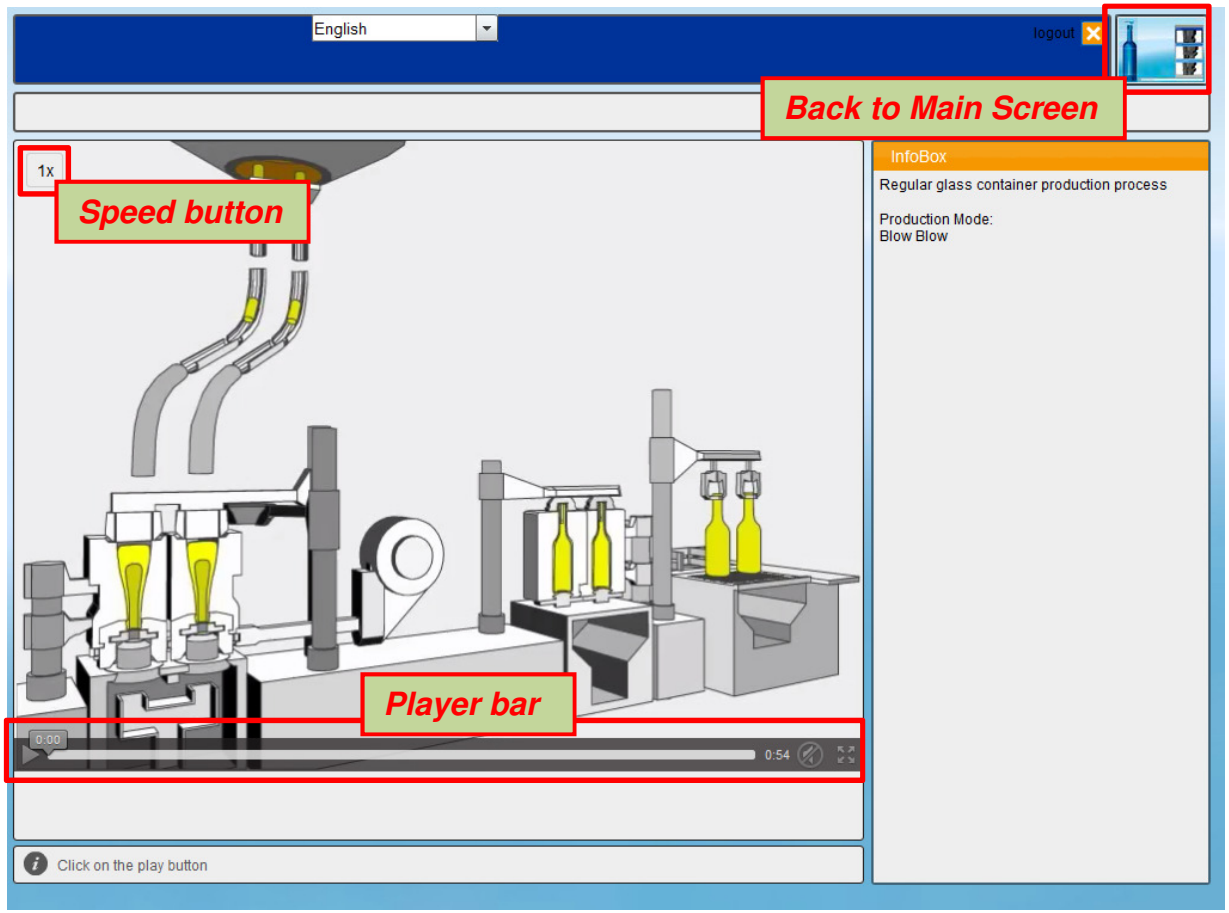

Figure 3: Process overview for complete container forming cycle

By clicking on the start-screen icon  in the upper right corner of the screen you will be directed back to the main page and the "Defect and Process Selection" screen (Figure 2). At the main page and the "Defect and Process Selection" screen after choosing the process you can select the defect you want to learn about by moving the mouse over the different sections of the container on the left

hand side (*"Container for area selection"*). When moving over the container, the respective area will pop-up in the middle of the screen revealing icons of all defects which are available for this selected container area (*"Defects available for selected area"*)(Figure 4).

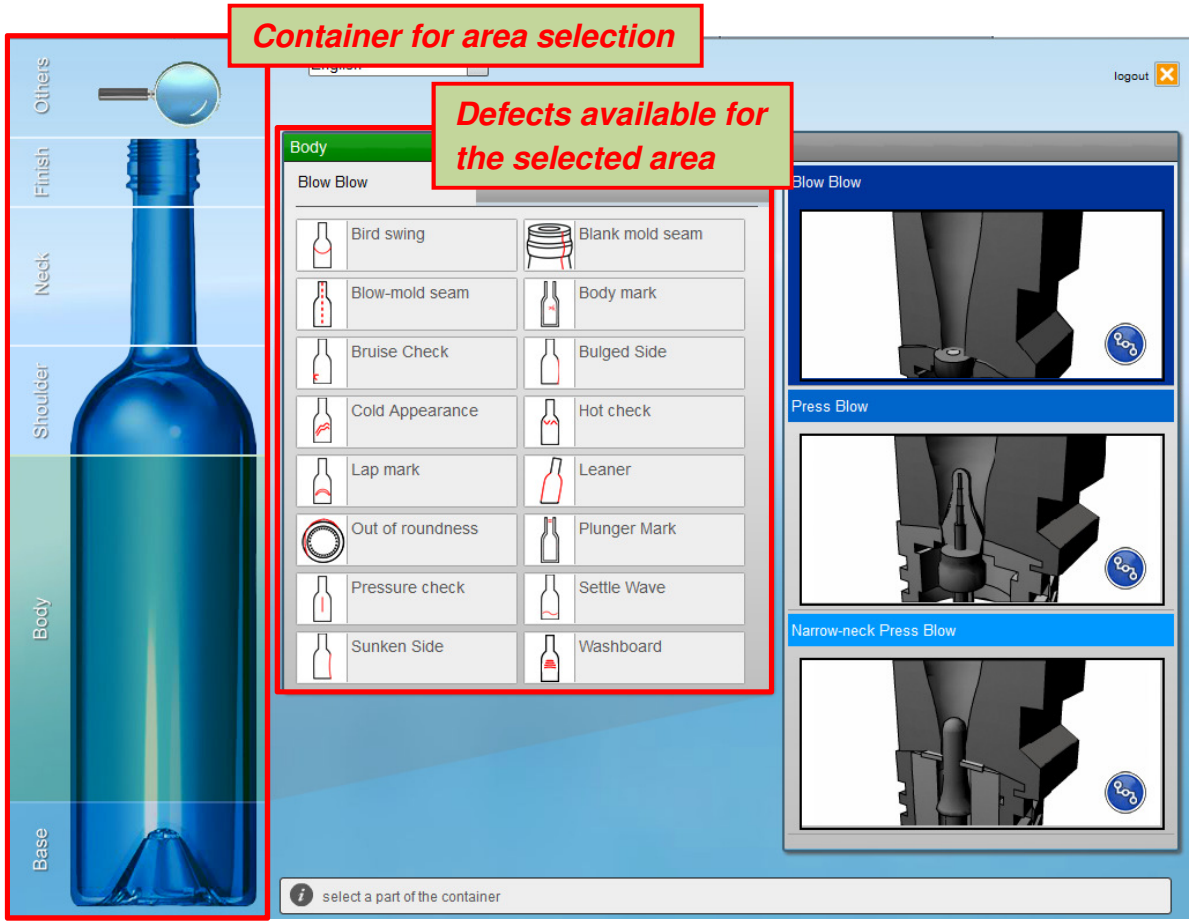

Figure 4: Defect and Process Selection Screen

By moving the mouse over a defect icon (*"Mouse over" on a selected defect*), a definition, delineation and example picture of the defect will occur at the right hand side of the screen, replacing the process choice (*Characteristics of selected defect*).

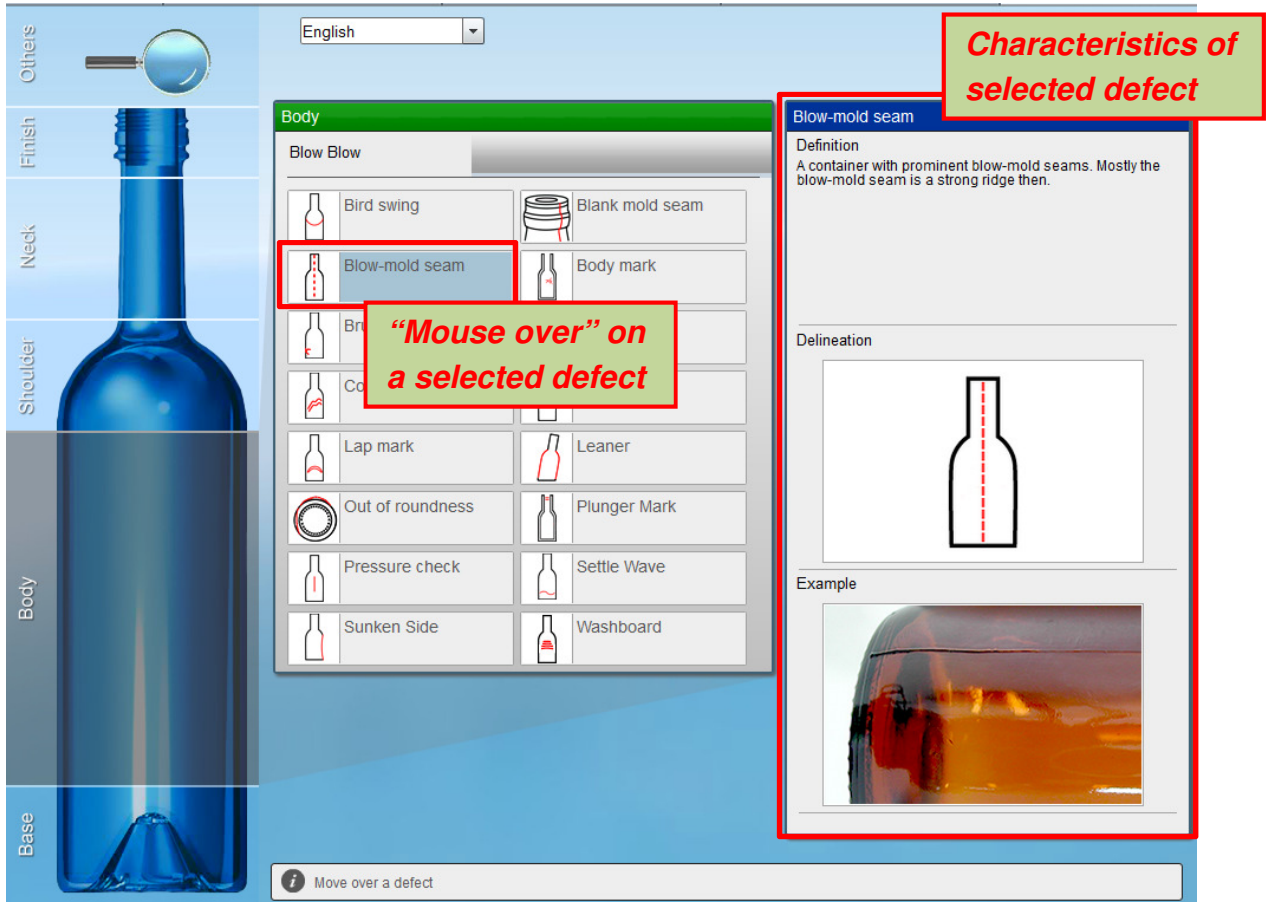

Figure 5: Defect and Process Selection Screen, mouse-over a selected defect

By clicking on the defect you will enter the specific defect screen "How the defect is made".

4.3 Specific Defect Screen “How the defect is made”

After accessing the specific defect screen “How the defect is made”, the screen changes to a simplified delineation of an IS machine section (Figure 6).

When moving over this delineation below there is again a player bar with a play/pause button as well as a time bar with run-time indicator and a full-screen button on the right side of the player bar (not available in Flash version). For details of usage of the player bar and the speed button, please refer to section 4.2.

Now you can view by clicking on the play button how the selected defect is generated *in general*. You will see an animation which explains how the defect is generated without giving any *specific* causes for the defect. When clicking play, first you will see a red square which illustrates where in the process the defect is generated. Then the animation follows.

The animation can be paused at any time by clicking on the play/pause button below the screen and can also be set to a specific position by moving the time indicator on the play bar to a desired position of the animation. Animations can be replayed as often as it is desired. In the info-box at the right hand side of the screen a short description of the content of the animation is given (*info-box*). This explanation is a helpful addition to the animation. Both, animation and info-box text should be observed.

There might be more animations available to explain the general origin of the selected defect. In this case you will see in the lower right corner of the screen the number of causes that are available for viewing (*number of causes*). When accessing the screen, the animation is set on “Cause 1”. For selection of the next cause, simply press the button and then press play at the play bar under the IS machine delineation for starting the animation.

By clicking on the defect icon  in the upper left corner of the screen, the right side changes and the explanation, delineation and picture of the defect will be shown, similar to the previous screen seen in Figure 5 (*Characteristics of selected defect*).

By clicking on the start-screen icon  in the upper right corner of the screen you will be directed back to the main page and the “Defect and Process Selection” screen (Figure 2) which allows you to choose a new defect and process.

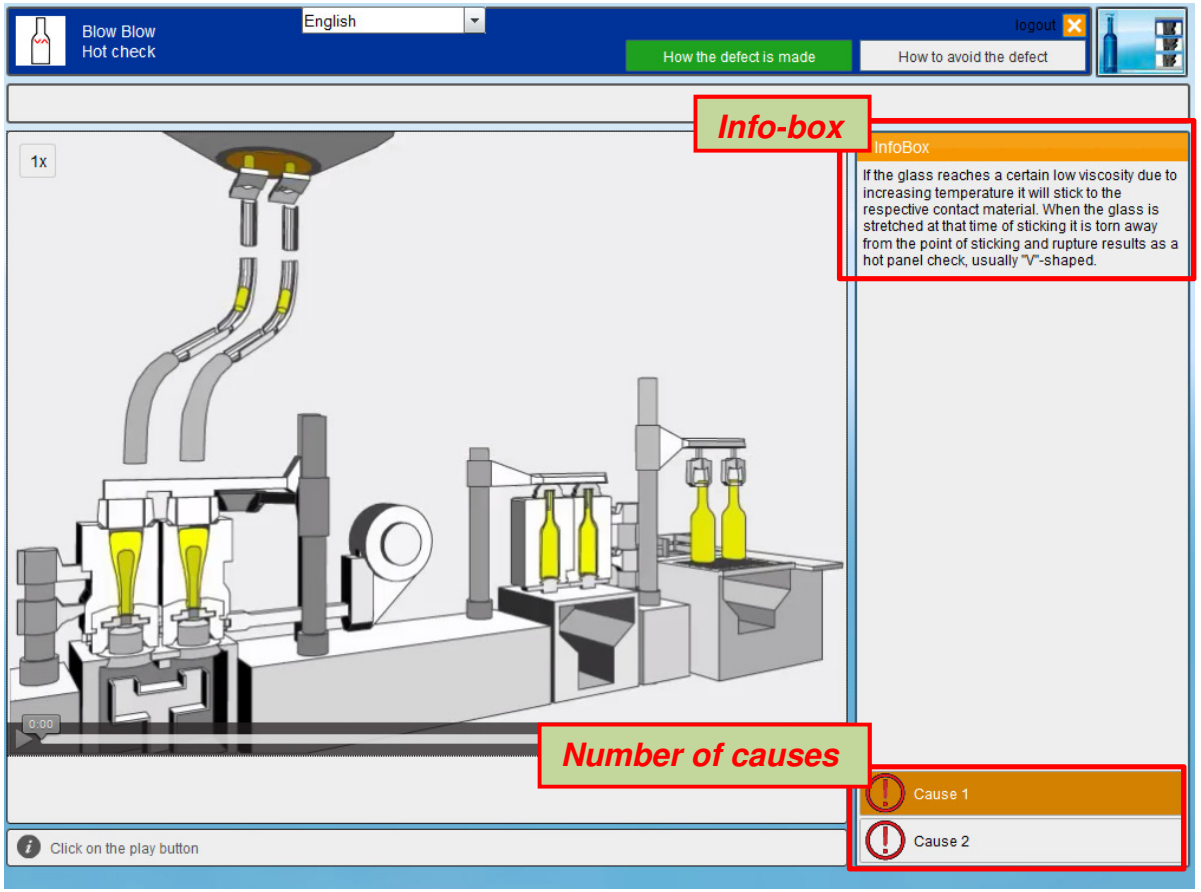

Figure 6: Specific Defect Screen “How the defect is made”

4.4 Specific Defect Screen “How to avoid the defect”

By clicking on the “how to avoid the defect” button in the upper right area of the screen, you will be directed the Specific Defect Screen “How to avoid the defect” (Figure 7). The structure and usage of this screen is similar to the previous screen in section 4.3, so please refer to paragraph 4.3 for a detailed usage description.

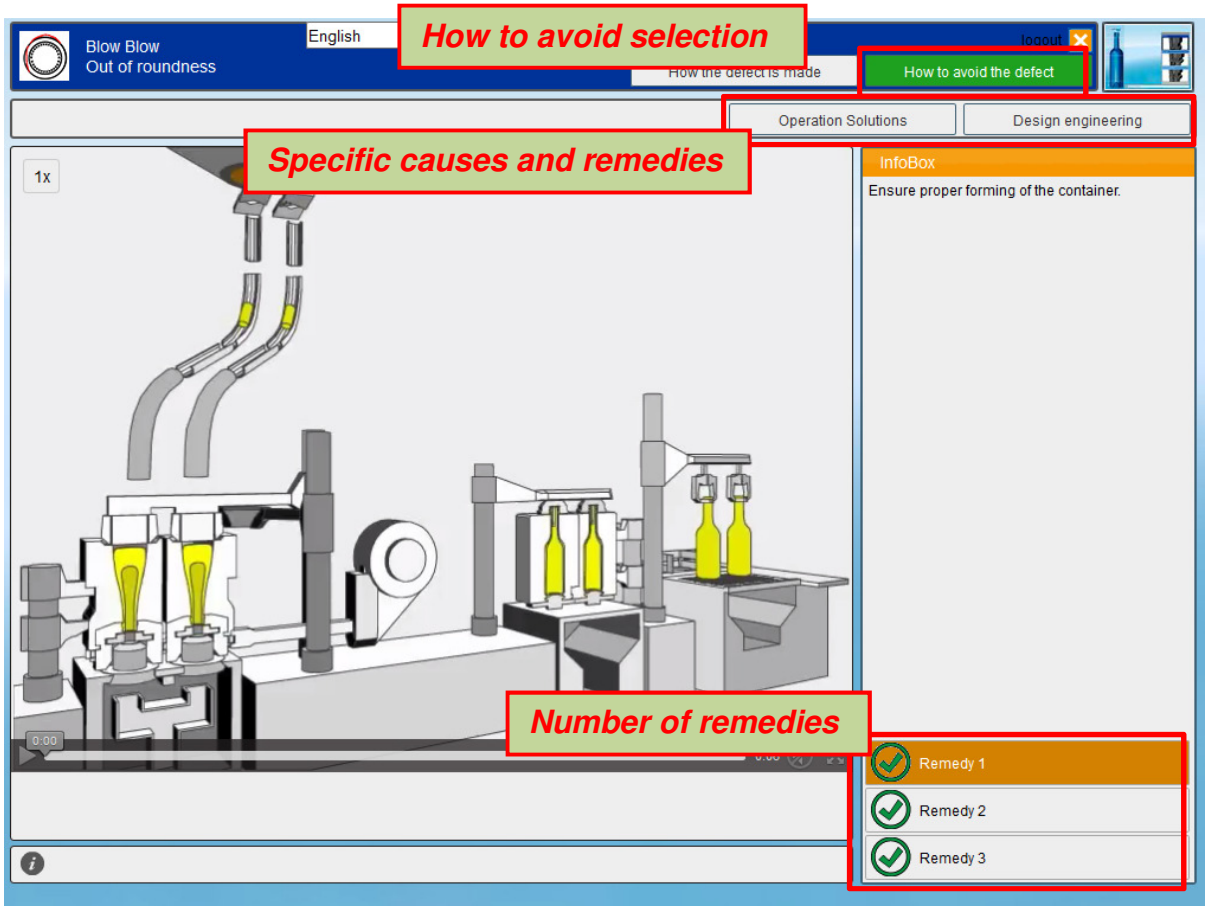

Figure 7: Specific Defect Screen “How the defect is made”

In this screen you can view how the selected defect is avoided *in general*. You will see animations which explain how the defect is avoided without giving any *specific* remedies for the defect.

There might be more animations available to explain the general avoidance of the selected defect. In this case you will see in the lower right corner of the screen the number of causes that are available for viewing (*number of remedies*). When accessing the screen, the animation is set on “Remedy 1”. For selection of the next remedy, simply press the button and then press play at the play bar under the IS machine delineation for starting the animation.

Also, as soon as you have accessed the Specific Defect Screen “How to avoid the defect”, there will be two additional selections possible: “Operational Solutions” and “Design Engineering” (*Specific causes and remedies*), the next chapter.

4.5 Specific defect screens “Operational Solutions” and “Design Engineering”

When you have accessed the “How to avoid the defect” screen you can chose between *specific* defect causes and remedies descriptions. These descriptions are structured in two areas:

1. Operational Solutions
2. Design Engineering

You can access these areas by clicking on the respective button in the upper right corner just below the “How to avoid the defect” button (see Figure 8, *Specific causes and remedies*).

It is important to notice that the tool does not imply any prioritization of listed remedies. The remedies are listed in alphabetical order. The decision which remedy to apply at which defect is solely in the responsibility of the operator. This is important because many strategies are available to produce a glass container and therefore no general strategy on defect avoidance can be given.

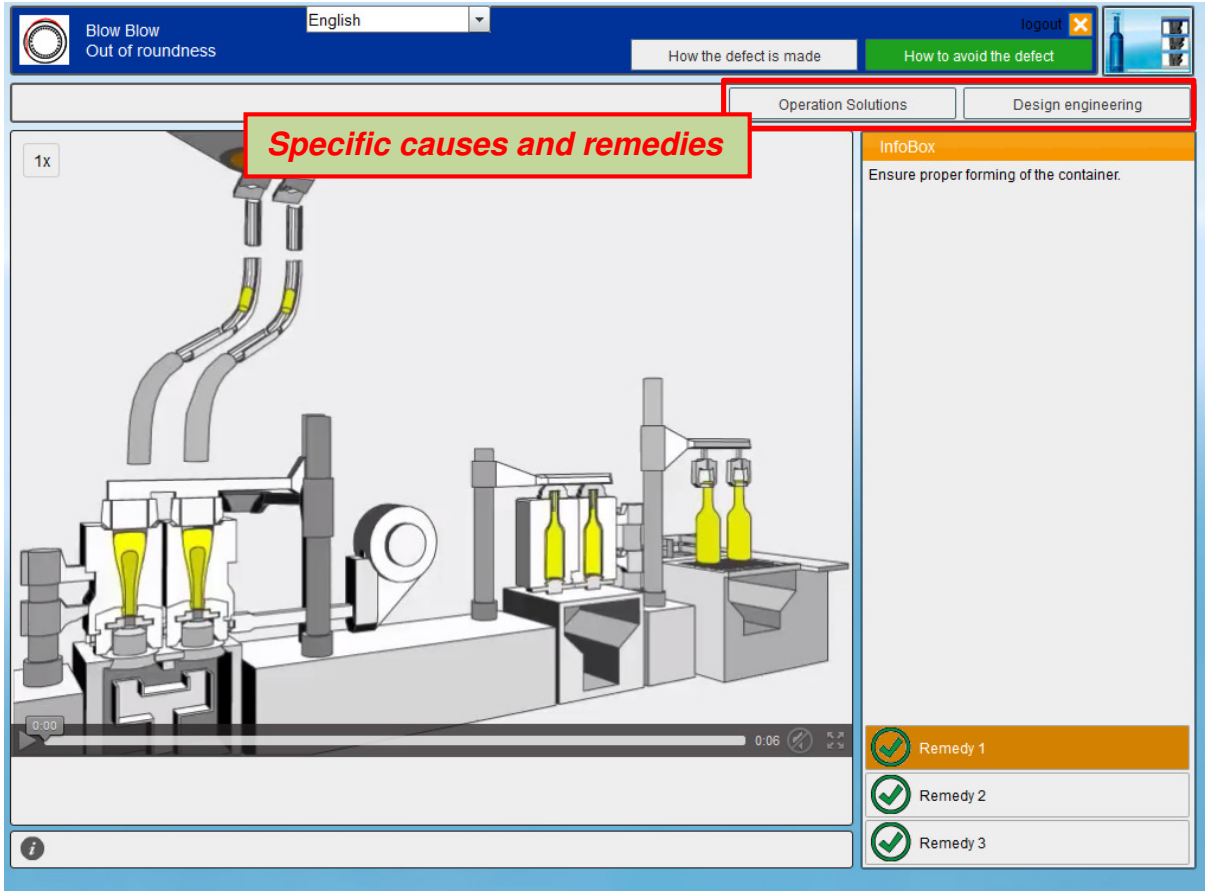

Figure 8: Specific Defect Screen "How the defect is made"

4.5.1 Operational Solutions

You can access the *Operational Solutions* by clicking on the respective button in the upper right corner just below the “How to avoid the defect” button (see Figure 8, *Specific causes and remedies*).

In this screen, *specific* causes and remedies of the selected defect *which can be applied at the machine floor* are listed (see Figure 9). You will find a list of specific reasons for a defect at the right hand side of the screen (*Available Operational Solutions*) with a general description in the info-box.

Below the info-box it is indicated how many causes or remedies are available for this specific case. “*Cause 1*” is always selected as default. By starting the animation you will see how this cause generates the defect. And by selecting the available remedy / remedies in the lower right corner you can start the animation(s) which explain(s), how this specific defect cause can be eliminated (*Causes and remedies Selection and info-box*).

When clicking play, first you will again see a red square(s) which illustrates where in the process the defect is generated. Then the animation follows. In the info-box an explanation to the animation is given. This explanation is a helpful addition to the animation. Both, animation and info-box text, should be observed.

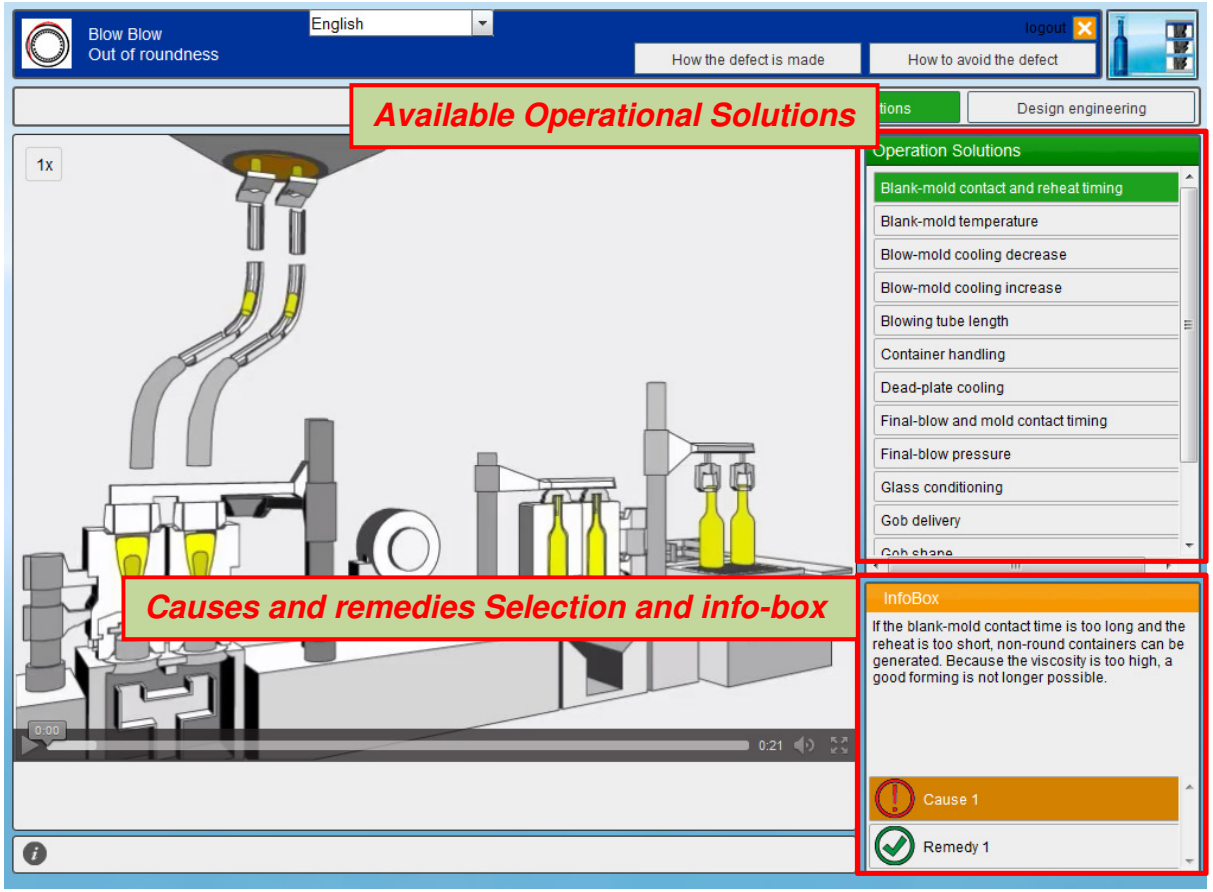

Figure 9: Specific Defect Screen "Operational Solutions"

Please note that for the operational solutions well as for the specific causes and remedies there might be scroll bars available if not all listed options fit into the screen window. Also for some solutions only a remedy can be listed if there is no clear cause connected.

4.5.2 Design Engineering

You can access the *Design Engineering* by clicking on the respective button in the upper right corner just below the “How to avoid the defect” button (see Figure 8, *Specific causes and remedies*). In this screen, specific causes and remedies of the selected defect which can be applied at the mould shop are listed. The usage of the screen is the same as in section 4.5.1 *Operational Solutions*, so please refer to this previous section for a detailed usage description.

5 Disclaimer

No assurance / No guarantee / Liability waiver

Although IPGR exercises maximum diligence to ensure that the information in this manual is accurate at the time of publication, IPGR does not provide any guarantee or assume any responsibility for correctness, reliability or completeness. The information appearing in this manual may be changed at any time without prior notice. No guarantee - either explicit or implicit - is given for the accuracy of the information published in this manual. IPGR shall not be liable in any way (including negligence) for damage or subsequent damage arising from the use of this manual or elements of it.

6 Impressum

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