



## 8. Process Engineer Manual

### General Overview:

Standing experience.

- Process engineer is an experience where the users will have to monitor and track the status of four different machines involved in the production of iron ore pellets.
- These machines are Hammer Crushers, magnetic separators, froth flotation cells, and disc pelletizers.
- The user works in an office environment where they will have access to different configuration values for the machines and can track if any maintenance needs to be done under.
- This simulation has a heavy emphasis on problem-solving, once the user has completed the tutorial they will have to troubleshoot the four machines without any guidance using the information they have learned.
- They will be required to make several phone calls to the maintenance team who can quickly fix the different machines if any of them break down.
- They are able to look outside of the simulation and see the mine from the mining engineer simulation and the cable shovel excavator they control in the machine operator simulation.

### Macros / Shortcut keys:

T = turn teleportation on or off

**Wrist Watch:** The wrist watch is always on the user's left wrist. When a call is coming in for the user, the icon on the watch will be an orange vibrating phone (Image 1 below). They must place their right hand on top of the watch and a blue circular progress bar will fill up (Image 2 below). Once it is filled, the call will be answered and the watch icon will become a green chat bubble (Image 3 below). When the call is finished, the watch icon will become a yellow question mark (Image 4 below). When the yellow question mark is visible, the user can place their right hand on top of the watch and the narrator will repeat the last set of instructions.

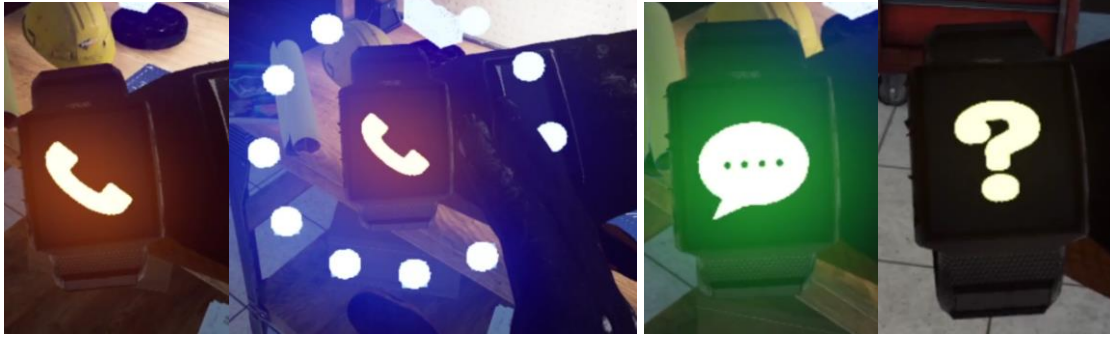


Image 1

Image 2

Image 3

Image 4

**Facilitator Panel:** The facilitator panel is an options menu that allows a simulation facilitator to adjust gameplay and accessibility options while a user is inside the experience. To access the facilitator panel during the simulation, press the TAB key.



There are five core options from this menu:

**Hint Task:** When pressed, the in-game narrator will repeat their most recent instruction, which is helpful if the user misses something or is distracted while in the simulation.

**Print Screen:** This button will save a screenshot of the current view that the user sees.

**Settings:** This will bring the facilitator into a separate menu screen where they have multiple options to change the experience. This is detailed below.

**Restart:** This will restart the simulation from the very beginning.

**Quit:** This will exit the experience.

**Greyed out buttons:** Finish Task & Restart Task - These functions are not currently working but will be implemented in the near future.

**Settings:** The gameplay settings have an additional set of toggles and sliders the facilitator can adjust during the simulation.



**Force Grab:** If someone is unable to reach something or is running the experience while seated, this option allows the user to grab objects without being directly next to them. The user can point their hands at objects that are far away and pulling the trigger will bring the object into their hand, grabbing it

**Teleportation:** This will turn on the granular teleportation around the game world. To use teleportation 1) hold down the center thumbpad button (Vive Pro) or push forward on the thumb joystick (Oculus Rift S) to create a blue teleportation arc 2) select a location to go by moving the controller until the blue circle at the end of the arc is in the desired location (A red line means that locations is not valid or blocked) and 3) release the center thumbpad button (Vive and Vive Pro) or thumb joystick (Oculus Rift S) which will cause the screen will quickly fade to black and when it fades back in, the user will be in a new location.

**Seated Experience:** When turned on, this option will move the user's location in the game world to be higher up, so that if they are sitting down, their view will be similar to a standing position.

**Language:** This drop-down menu will allow the facilitator to change the language of the experience. When changing language, the simulation will need to restart.

**Volume:** This slider will adjust the master volume of the game. If the sliding bar is on the right side, the volume will be at 100% and on the left side, the volume will be set to 0%.

**Full written walkthrough:**

Quest	Task	Description
1	A	Answer your watch by holding your right hand above the watch icon on your left hand
1	B	Listen to introduction about the career
1	C	Turn on camera 1 by pressing the button labeled 1 on the desk

1	D	Listen to information about the hammer crusher
1	E	Turn on camera 2 by pressing the button labeled 2 on the desk
1	F	Listen to information about the magnetic separator
1	G	Turn on camera 3 by pressing the button labeled 3 on the desk
1	H	Listen to information about the froth flotation cells
1	I	Turn on camera 4 by pressing the button labeled 4 on the desk
1	J	Listen to information about the disc pelletizer
2	A	Listen to instructions from the narrator
2	B	Turn on center screen by flipping the switch on the desk
2	C	Listen to the narrator explain the plant output screen
2	D	Pull up the hammer crusher configurations by pressing the button labeled 1 on the desk
2	E	Set the hammer crushers configuration values to match the chart using the arrow keys on the desk. The correct values are 60 (conveyor speed) and 70 (hammer speed).
2	F	Set the magnetic separators configuration values to match the chart using the arrow keys on the desk. The correct values are 60 (conveyor speed) and 80 (power).
2	G	Set the froth flotation cells and disc pelletizers configuration values to match the chart. The correct values are 40 (reagent), 60 (input speed) for the froth flotation cells and 60 (disc speed), 60 (binding agent) for the disc pelletizers.
2	H	Wait until the main plant output quality reaches 100%
2	I	Auto completes
3	A	Switch which machine configuration values are being shown on-screen by pressing the buttons labeled 1 through 4 on the desk and check that their values match the poster of yesterday's values.
3	B	Listen to the narrator
3	C	Turn on the 12 large monitors above the desk by flipping the switch in front of the plant output screen
3	D	Listen to the narrator
3	E	Open up the booklet by tapping on the cover and flip to the magnetic separate page in the booklet by tapping on the tab labeled MS
3	F	Pick up the phone and dial the number of the person who can fix the break down. Stay on the phone until they tell you the problem is fixed.
3	G	Listen to the narrator
4	A	Listen to the narrator

4	B	If the plant output falls below 100%, try 1) checking the configuration values of all 4 machines 2) inspecting the 12 monitors above the desk for any red warnings
4	C	If the plant output falls below 100%, find the problem using the information you've learned.
4	D	If the plant output falls below 100%, find the problem using the information you've learned.
4	E	If the plant output falls below 100%, find the problem using the information you've learned.
4	F	Listen to the final tips from the narrator

## **Map**

**Location 1 - The Office:** The office is where the user will spend the entire simulation. There is a large console in front of them which has multiple controls and a phone with a dial pad on the right which they can use to call the maintenance team. The main screens in front of the player display video footage of the different machines on the left, the different configuration values of those machines in the centre, and the overall plant output on the right. There are 12 large monitors above the console that they can look at to get information about the status of the different machines.



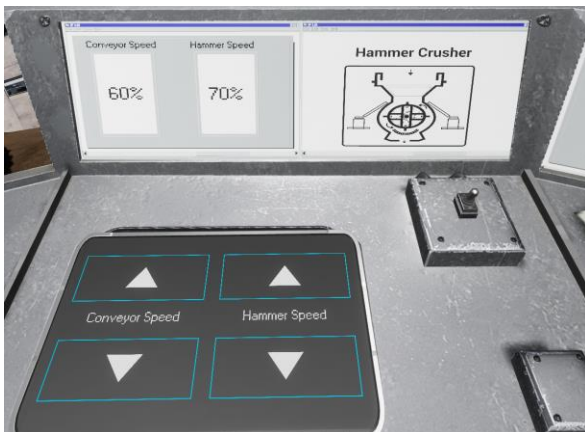
## Key Objects

Note: Some objects will not be visible at the beginning of the tutorial and will only appear when they are required.

**Camera Control Buttons:** There are four buttons on the left side of the console that will switch which machine is being displayed on the monitor. The button labelled 1 displays the hammer Crushers, button 2 displays the magnetic separators, button 3 displays the froth flotation cells and button 4 displays the disc pelletizer. These buttons will also change which machine configuration values are displayed on the centre screen when it has been turned on.



**Machine Configuration Interface:** The machine configuration interface is in the centre area of the console. First to turn on the machine configuration interface, the user must flip a switch on the console. Once that switch has been flipped, a monitor will be displayed and in front of that there will be an intractable touchscreen where the user can adjust these values but pressing arrow keys. When the user has a machine selected on the left monitor, two values for that machine will be displayed in the center screen. The user will need to adjust these values throughout the simulation to match specific values listed on the chart (Values Chart) hanging on the wall to the left of the console.



Machine Configuration Interface

	Hammer Crusher	Magnetic Separator	Froth Flotation Cell	Disc Pelletizer
Conveyor Speed	60	60	X	X
Disc Speed	X	X	X	60
Hammer Speed	70	X	X	X
Electro-Magnetic Power	X	80	X	X
Support Airflow	X	X	40	X
Roller Speed	X	X	60	X
Rolling Apron Airflow	X	X	X	50

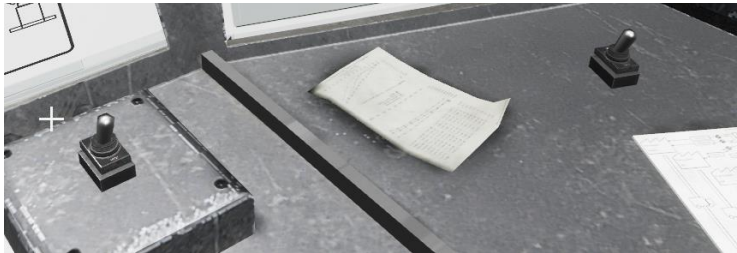
Values Chart

The machine configurations and correct values for each are:

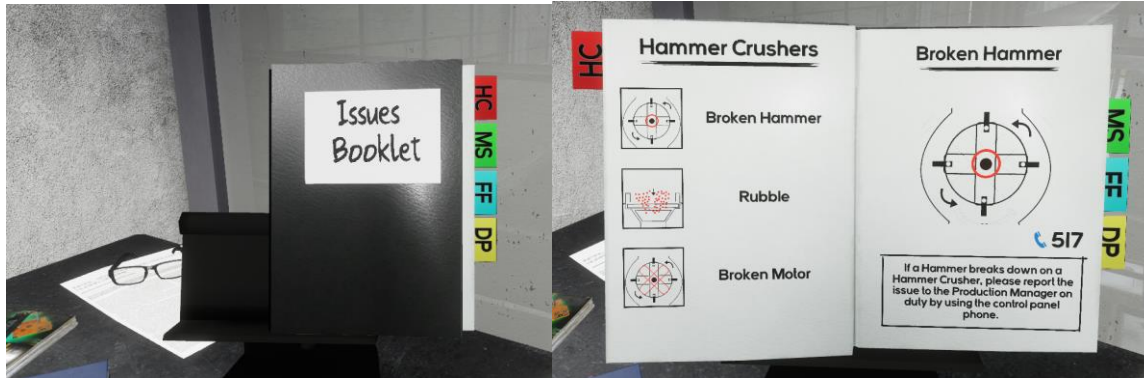
Hammer Crusher:	Conveyor Speed = 60	Hammer Speed = 70
Magnetic Separator:	Conveyor Speed = 60	Electromagnetic Power = 80
Froth Flotation Cells:	Reagent Amount = 40	Input Speed = 60
Disc Pelletizer:	Disc Speed = 60	Binding Agent Amount = 50

If any of the values displayed on the users monitor do not match these, the plant output will drop.

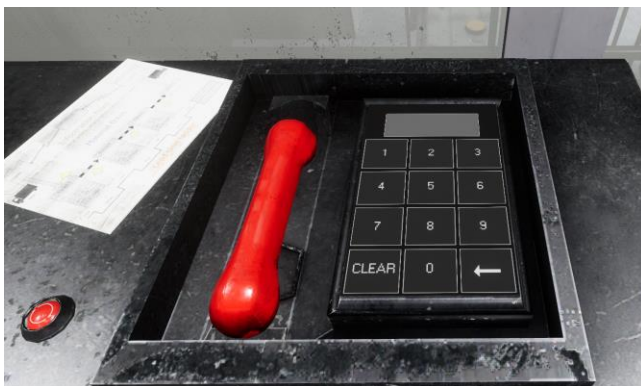
**Screen Switches:** There are two switches on the console that the user can flip on which will turn on either the machine configuration values screen and plant output or the 12 monitors that display the machine's current status.



**Issues Booklet:** The issues booklet is located on the right side of the workspace and contains the phone numbers of the maintenance crews that need to be called if any of the machines break down. It can be opened by tapping on the cover, which will bring you to the page for the hammer crushers. The user can tap on the different types of machine breakdowns on the left page and the right page will be updated with the information about that type of breakdown. the extension of the maintenance crew will be located on the bottom right of the page. There are tabs on the left side and right side of the book that the user can touch with their index finger and that will bring them to that machine's breaktown types. The abbreviations are HC for hammer crusher, MS for magnetic separator, FF froth flotation cells and DP for disc pelletizer.

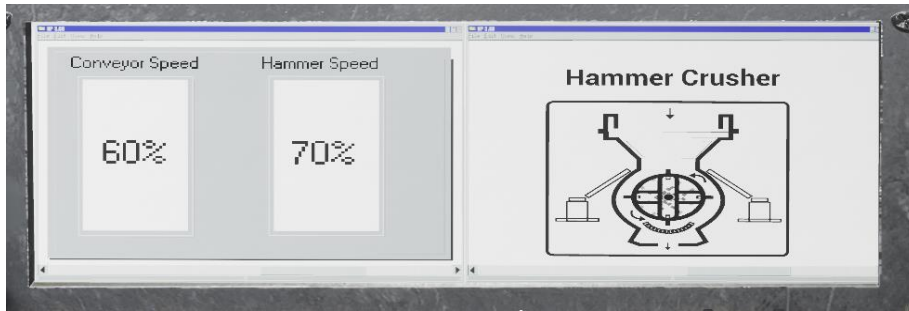


**Phone and Dialpad:** The phone and dial pad are located to the right of the issues booklet which are located on the right side of the work area. The phone is used to call the maintenance crews that can fix any of the machine breakdowns. You can dial their extension on the dial pad before or after picking up the phone. Once you are in contact with the correct person, be sure to stay on the line as they will be able to fix it and then let you know when the machine issue has been fixed. If the user loses the phone, there is a small button on the left of the dial pad that can be used to retract the phone.



**Screens and Monitors:** There are several monitors in this simulation that all display important information. There are three main screens on the console and 12 monitors on the wall behind it (all detailed below). They display video footage of the different machines on the left (Left Camera Monitor), the different configuration values of those machines in the centre (Center Machine Configuration Monitor), and the overall plant output on the right (Plant Output Monitor). The 12 screens above the console display the current status of the machines (Machine Status Screens). Each machine is assigned a single column of screen, and each column has three different screens. The user will need to check these screens and look for any red flashing on the screens, which means that that component of that machine has broken down. The user will have to check the issues booklet and match the flashing problem with the pictures in the book to determine what specifically has broken down and then use the phone to call the maintenance crew that can fix that problem.

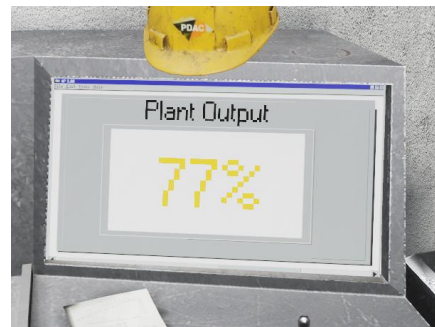




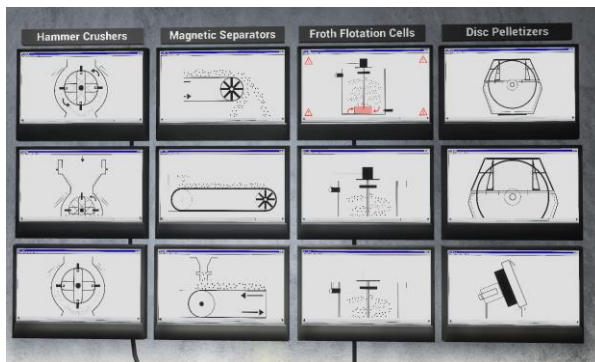
**Machine Configuration Monitor**



**Camera Monitor**



**Plant Output Monitor**



**Machine Status Screens**

**Freeplay vs. Tutorial:**

In the tutorial, the narrator will explain how to use the various buttons and interfaces and also how to troubleshoot the machine breakdowns. This will include how to use the 4 machine buttons on the left, the machine configuration interface in the centre, and the issues booklet and phone on the right. At the end of the tutorial, the user will need to use the information they have learned throughout the tutorial to maintain the plant output at 100%. This will require the user to adjust the configuration values using the centre interface and calling a few different maintenance Crews to fix certain problems. This part is generated randomly each time the simulation is run.

In freeplay, the user will be able to interact with everything in the work area and every few seconds a different problem will arise. The user will need to be checking the monitors on the left and in front of them to see if any of the configuration values are off and check the monitors above the console to see if any of the machines have broken. Issues will continue to arise indefinitely.

**Common Issues:**

Issue 1: During the tutorial, if the user has changed one of the configuration values without knowing it the quest may not progress. Have them check all four of the different machines by switching between them using the buttons on the left and checking that their values on the centre screen match those of The Valleys on the chart.

Issue 2: If the user cannot see the centre screen or plant output screen or the 12 monitors above the console, get them to flip the switches on the desk to make sure that they are both turned on.