



SHOTPlus™

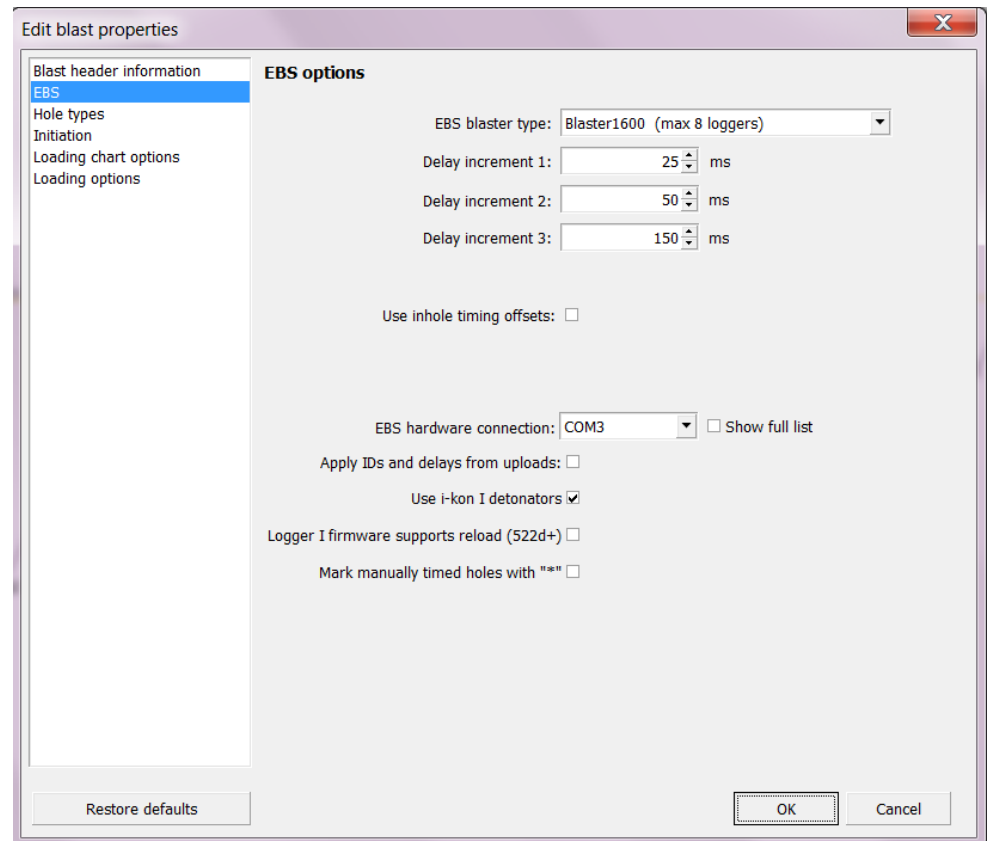
SHOTPlus Standard
Use of Electronic Blasting Tools

March 2017

SET-UP OPTIONS

Users can define EBS properties in **Blast Properties**

- Blaster Selection
- Hole to hole time increments
- Define COM ports
- Use of inhole timing offsets
- Apply use of logger upload information

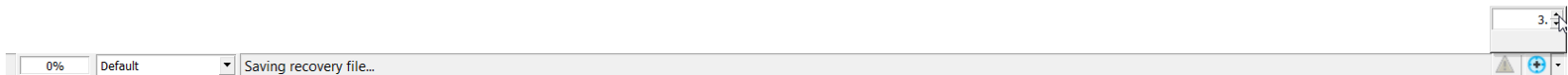
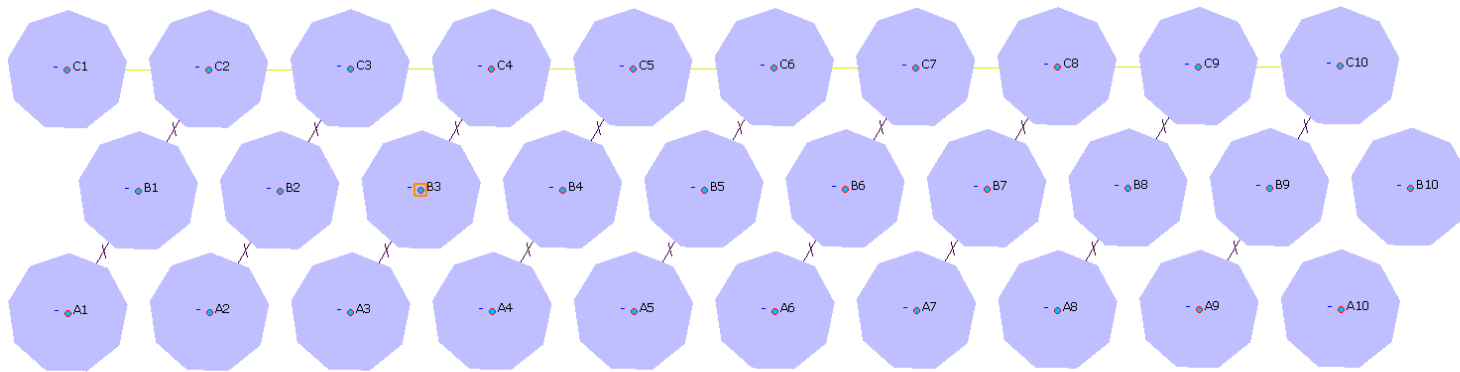


The screenshot shows the 'Edit blast properties' dialog box with the 'EBS options' tab selected. The left sidebar lists the following options: Blast header information, EBS (selected), Hole types, Initiation, Loading chart options, and Loading options. The main area contains the following settings:

- EBS blaster type: Blaster1600 (max 8 loggers)
- Delay increment 1: 25 ms
- Delay increment 2: 50 ms
- Delay increment 3: 150 ms
- Use inhole timing offsets: ☐
- EBS hardware connection: COM3 ☐ Show full list
- Apply IDs and delays from uploads: ☐
- Use i-kon I detonators: ☒
- Logger I firmware supports reload (522d+): ☐
- Mark manually timed holes with "M": ☐

At the bottom, there are buttons for 'Restore defaults', 'OK', and 'Cancel'.

- Search radius for hook-up of non-aligned rows



EBS TOOL ICONS



Add Logger

Single hole time
tool

Row time
tool

Time line
tool

Add /
Subtract
time

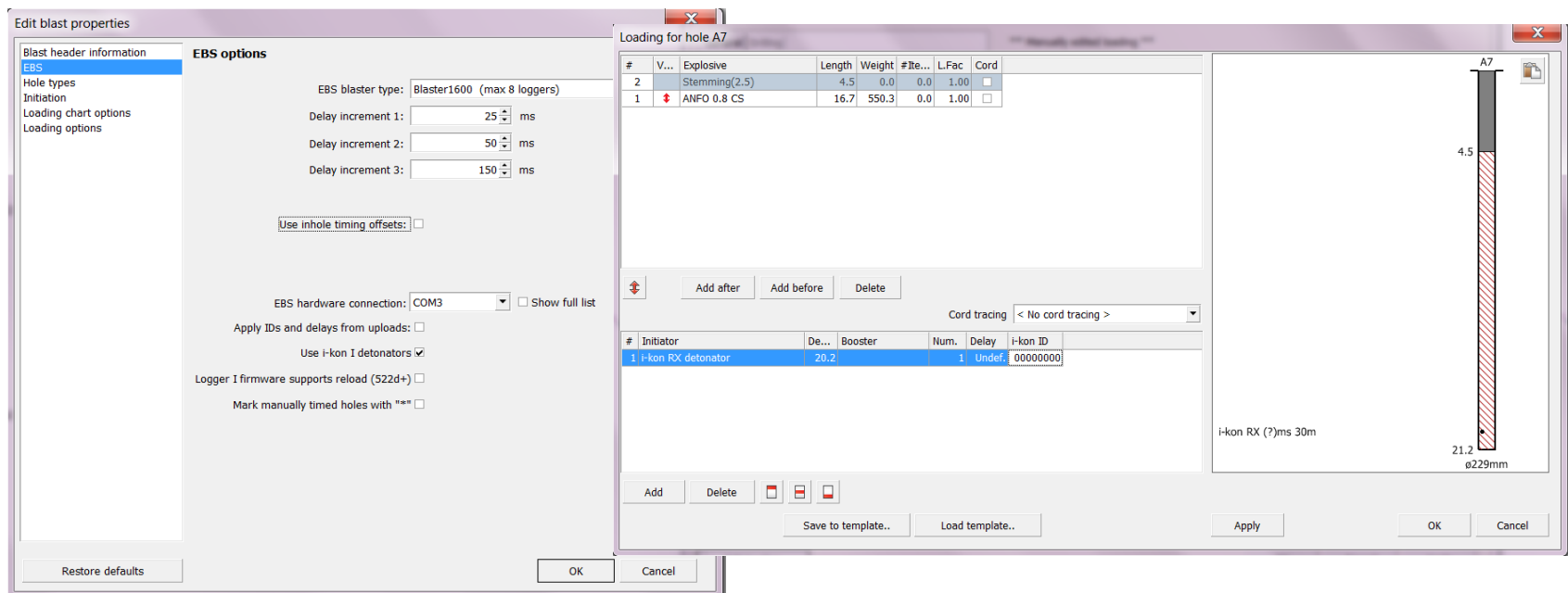
Opening
Point tool

IN-HOLE OPTIONS

- Holes must be loaded with EBS product before timing design can be applied

Option 1

- Load hole **without** time off-sets



The screenshot displays the 'Edit blast properties' dialog box with the 'EBS options' tab selected. The 'EBS options' section includes fields for 'EBS blaster type' (Blaster1600), 'Delay increment 1' (25 ms), 'Delay increment 2' (50 ms), and 'Delay increment 3' (150 ms). There is a checkbox for 'Use inhole timing offsets' and a dropdown for 'EBS hardware connection' (COM3). Below these are checkboxes for 'Apply IDs and delays from uploads', 'Use i-kon I detonators', 'Logger I firmware supports reload (522d+)', and 'Mark manually timed holes with ***'. The 'Loading for hole A7' sub-dialog is also visible, showing a table of explosive materials and a diagram of the hole layout.

#	V...	Explosive	Length	Weight	#It...	L.Fac	Cord
2		Stemming(2.5)	4.5	0.0	0.0	1.00	<input type="checkbox"/>
1	↓	ANFO 0.8 CS	16.7	550.3	0.0	1.00	<input type="checkbox"/>

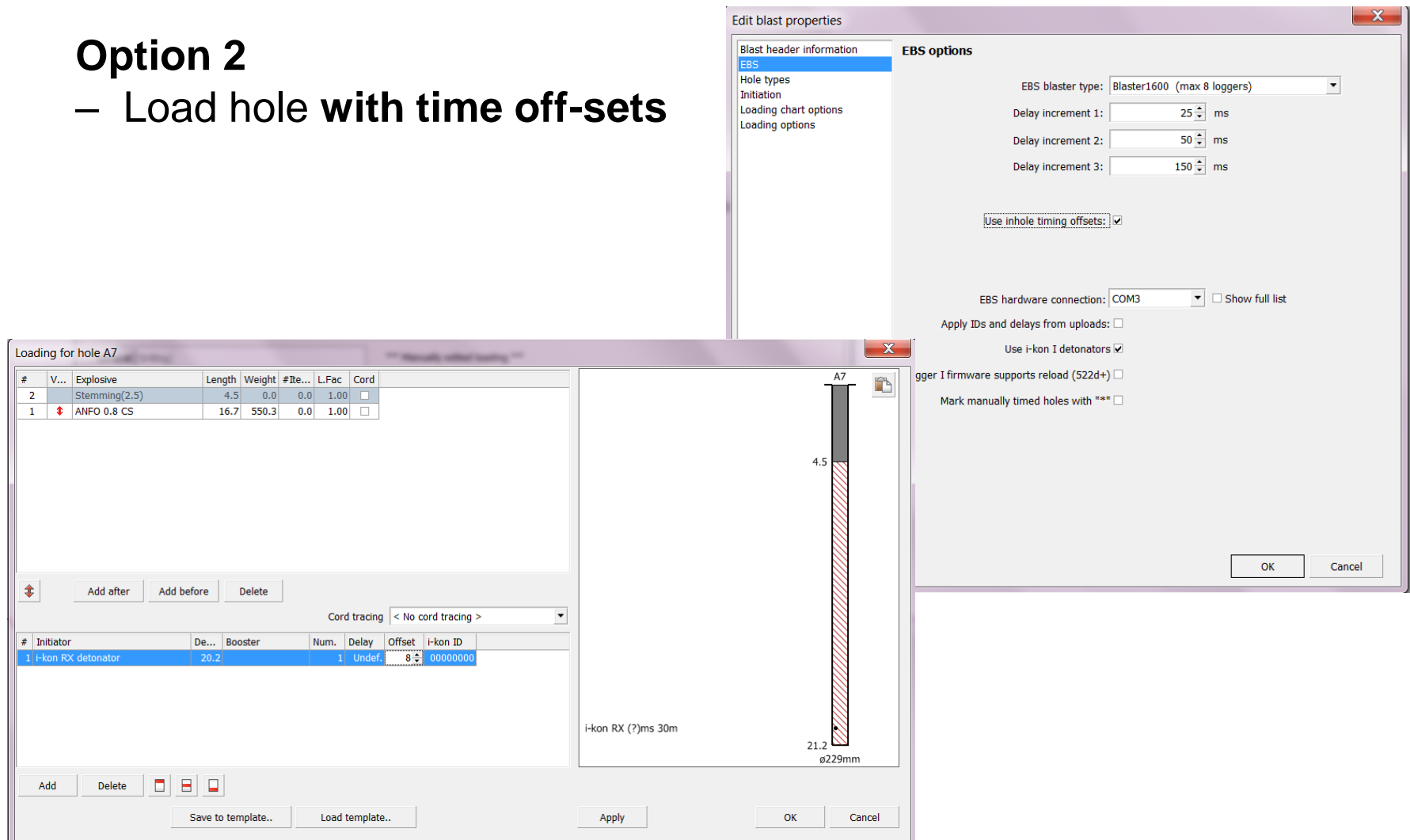
#	Initiator	De...	Booster	Num.	Delay	i-kon ID
1	i-kon RX detonator	20.2		1	Undef.	00000000

The diagram on the right shows a vertical hole labeled 'A7' with a diameter of 'ø229mm'. It indicates a '4.5' section at the top and a '21.2' section at the bottom, with a note 'i-kon RX (?)ms 30m'.

IN-HOLE OPTIONS

Option 2

- Load hole with time off-sets



The screenshot displays two overlapping windows from the SHOTPlus software. The background window is 'Edit blast properties', and the foreground window is 'Loading for hole A7'.

Edit blast properties dialog:

- Blast header information:** EBS, Hole types, Initiation, Loading chart options, Loading options.
- EBS options:**
 - EBS blaster type: Blaster1600 (max 8 loggers)
 - Delay increment 1: 25 ms
 - Delay increment 2: 50 ms
 - Delay increment 3: 150 ms
 - Use inhole timing offsets: ☒
 - EBS hardware connection: COM3 ☐ Show full list
 - Apply IDs and delays from uploads: ☐
 - Use i-kon I detonators: ☒
 - gger I firmware supports reload (522d+): ☐
 - Mark manually timed holes with "ast": ☐

Loading for hole A7 dialog:

#	V...	Explosive	Length	Weight	#It...	L.Fac	Cord
2		Stemming(2.5)	4.5	0.0	0.0	1.00	<input type="checkbox"/>
1	↓	ANFO 0.8 CS	16.7	550.3	0.0	1.00	<input type="checkbox"/>

Buttons: Add after, Add before, Delete

Cord tracing: < No cord tracing >

#	Initiator	De...	Booster	Num.	Delay	Offset	i-kon ID
1	i-kon RX detonator	20.2		1	Undef.	8	00000000

Buttons: Add, Delete, Save to template.., Load template.., Apply, OK, Cancel

Diagram of hole A7: A vertical cylinder with a diameter of ø229mm. The total height is 21.2m. The top section is 4.5m high and is shaded grey. The bottom section is 16.7m high and is shaded with red diagonal lines. The text 'i-kon RX (?)ms 30m' is at the bottom of the diagram.

SINGLE HOLE TIME SET TOOL



EBS timing

Time

☐ No change
☒ Increment
☐ Decrement

☒ 25 ms
☐ 50 ms
☐ 150 ms

...

Inhole timing determined by Initiator offset times.

Display Hole View

10 0 A1 35 25 A2 60 50 A3 ? ? A4 ? ? A5 ? ? A6 ? ? A7 ? ? A8 ? ? A9 ? ? A10

- Single click on each hole to apply time shown in the **Time box**
- Time will increase / decrease for next hole depending on increments set
- Additional detonators in the hole will have time increments as specified by the **in-hole delays**

ROW TIME SET TOOL



EBS timing

Time

☐ No change
☒ Increment
☐ Decrement

☒ 25 ms
☐ 50 ms
☐ 150 ms

...

Inhole timing determined by Initiator offset times.

Display Hole View

10 0 A1 ... ? A2 ... ? A3 ... ? A4 ... ? A5 ... ? A6 ... ? A7 ... ? A8 ... ? A9 ... ? A10

EBS timing

Time

☐ No change
☒ Increment
☐ Decrement

☒ 25 ms
☐ 50 ms
☐ 150 ms

...

Inhole timing determined by Initiator offset times.

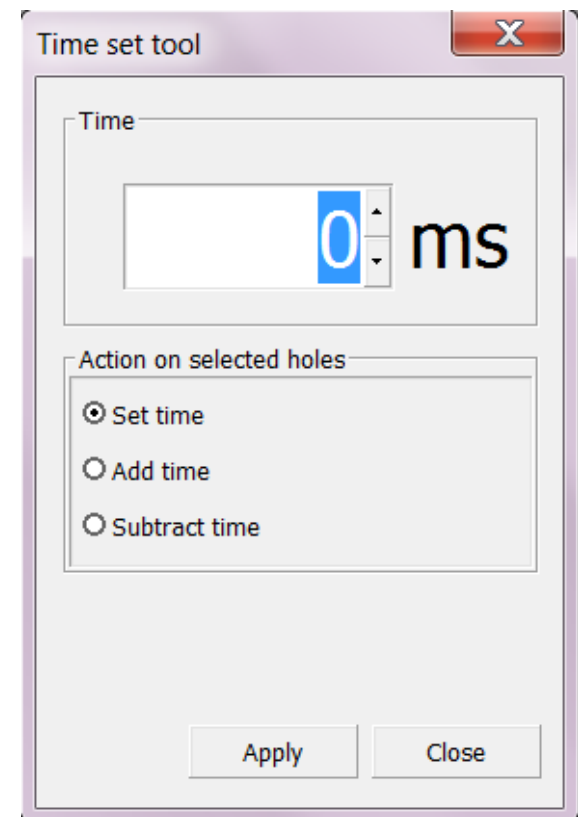
Display Hole View

10 0 A1 35 25 A2 60 50 A3 85 75 A4 110 100 A5 135 125 A6 160 150 A7 185 175 A8 210 200 A9 235 225 A10

- Set required search radius
- Click on first hole and drag away. Click on last hole
- Time in box will apply to first hole
- Time will increase / decrease for next hole depending on increments set

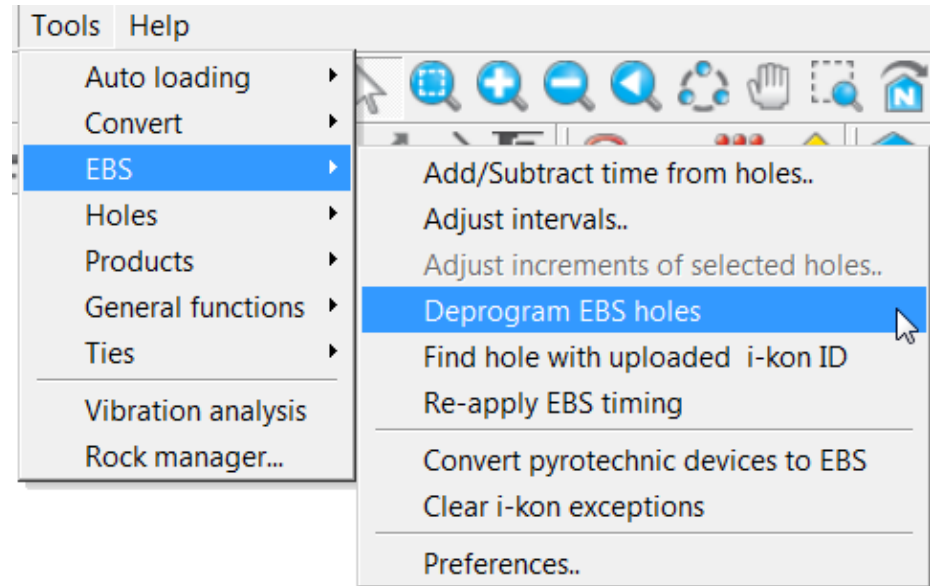
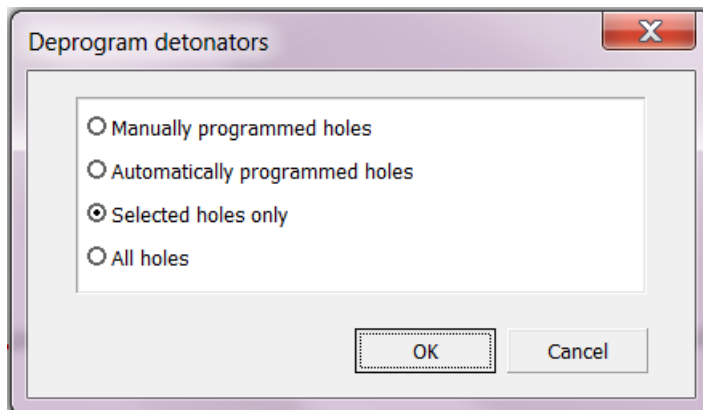
TIME SET TOOL

- Value will apply to the next clicked hole
- Set time: applies time in text box to the dets (according to in-hole offsets)
- Add time/Subtract time: adds or subtracts value in the text box from the current time of the hole
- Value can be set by
 - **Up / Down arrows** – increment / decrement by selected value
 - **Typing** a value in the box
 - **Ctrl - Click** on a timed hole to copy this time to the input box



DEPROGRAM EBS TIMES

- Removes times applied to **All, Selected, Manually Programmed** or **Automatically Programmed** holes



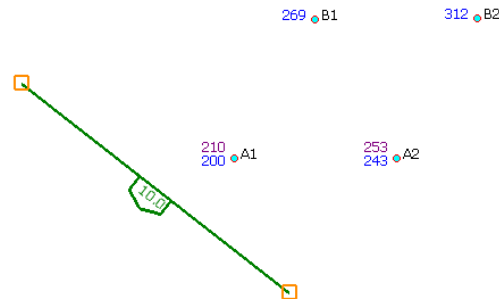
TIME LINE TOOL

Two options for time line tool



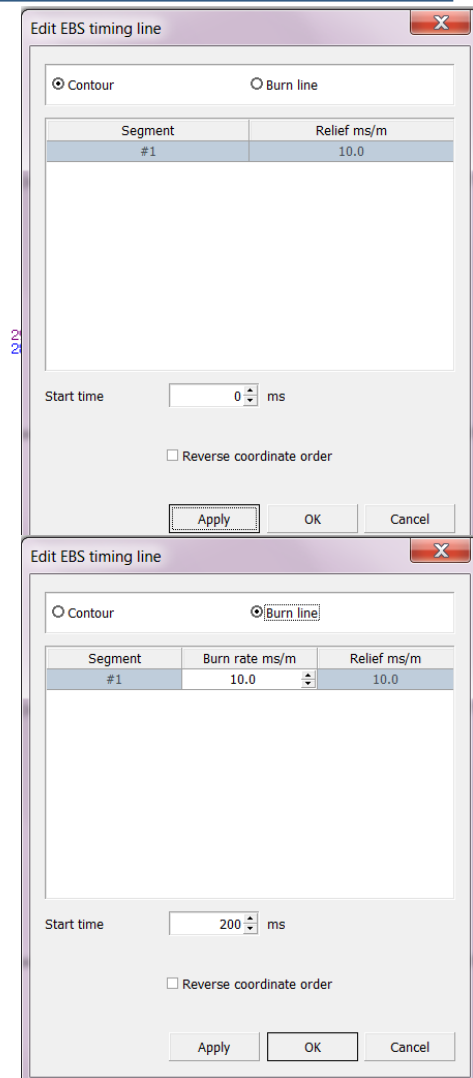
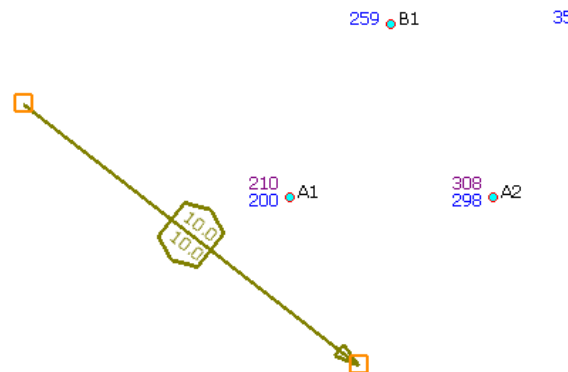
- **Contour Line**

Blast movement towards a line specified by burden relief



- **Burn Line**

Blast movement along and towards a line



Edit EBS timing line

☒ Contour ☐ Burn line

Segment	Relief ms/m
#1	10.0

Start time: 0 ms

☐ Reverse coordinate order

Apply OK Cancel

Edit EBS timing line

☐ Contour ☒ Burn line

Segment	Burn rate ms/m	Relief ms/m
#1	10.0	10.0

Start time: 200 ms

☐ Reverse coordinate order

Apply OK Cancel

TIME LINE TOOL - CONTOUR



- Draw line
 - 3 segments only
 - blast moves **towards left** of line as drawn
- Select line type
 - **contour** or burn line
- Specify **burden relief** for each line segment
 - in milliseconds per metre (**ms/m**)
- Input **start time**

338 C1

299 C2

269 B1

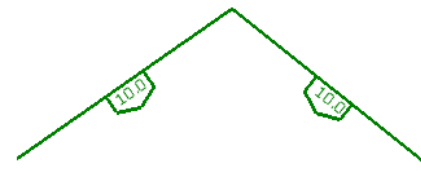
229 B2

250
240 A1

210
200 A2

213
203 A3

257
247 A4



Edit EBS timing line

☒ Contour ☐ Burn line

Segment	Relief ms/m
#1	10.0
#2	10.0

Start time ms

☐ Reverse coordinate order

TIME LINE TOOL – BURN LINE



- Draw line
 - 3 segments only
 - blast moves **towards start** of line
- Select line type
 - contour or **burn line**
- Specify **burn rate** and **relief** for each line segment
 - in milliseconds per metre (**ms/m**)
- Input **start time**

Edit EBS timing line

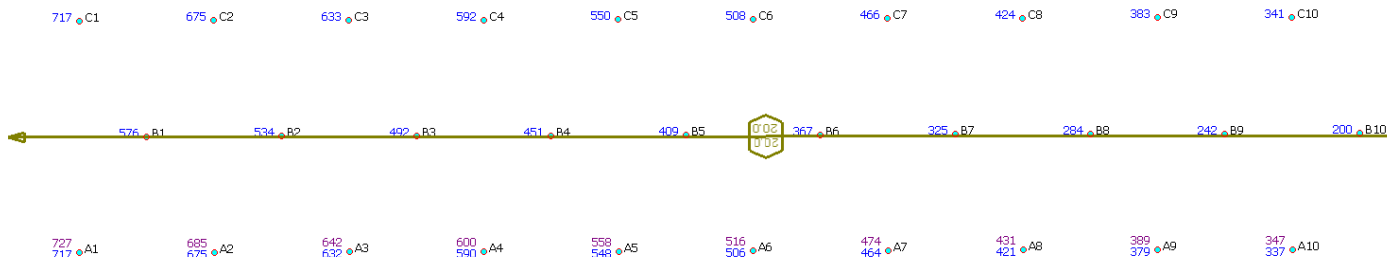
☐ Contour ☒ Burn line

Segment	Burn rate ms/m	Relief ms/m
#1	6.0	20.0

Start time ms

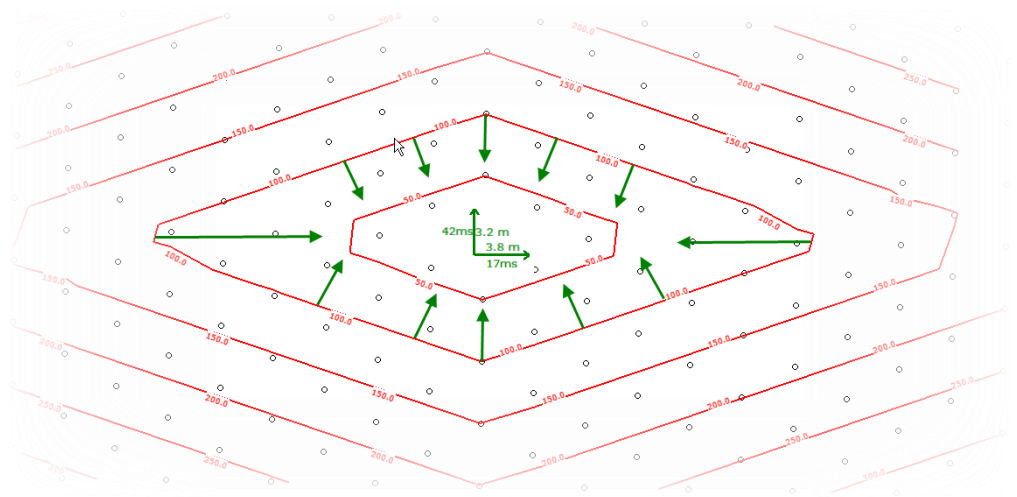
☐ Reverse coordinate order

Apply OK Cancel



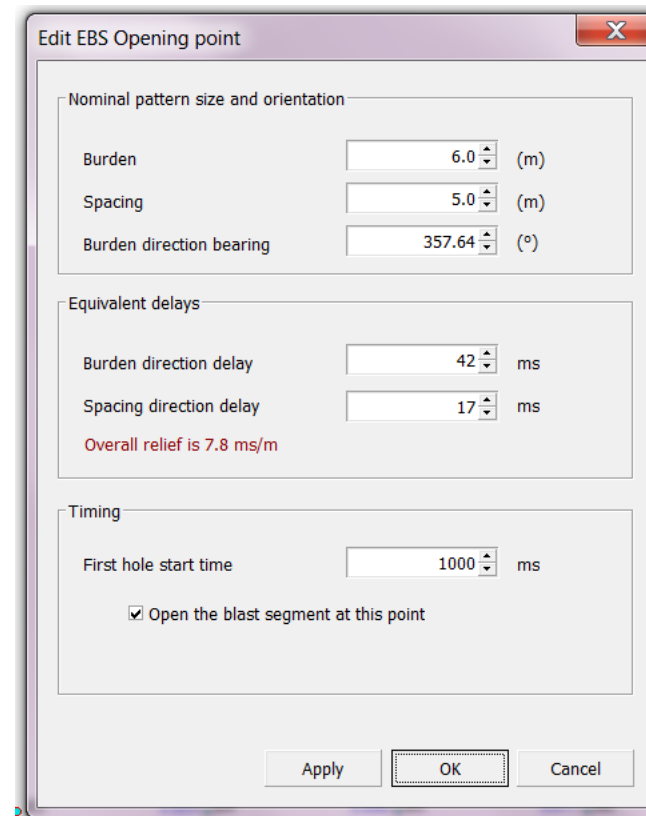
OPENING POINT TOOL

- **Opening Point tool**
Blast movement towards a point specified in the blast.
Movement orientation can be changed with **relief timing** in two directions



OPENING POINT TOOL

- Open tool and specify
 - burden
 - spacing
 - burden direction
 - required burden / spacing times
 - start time
- Place opening point on plan
 - adjust location
 - adjust rotation to suit



Edit EBS Opening point

Nominal pattern size and orientation

Burden	6.0	(m)
Spacing	5.0	(m)
Burden direction bearing	357.64	(°)

Equivalent delays

Burden direction delay	42	ms
Spacing direction delay	17	ms

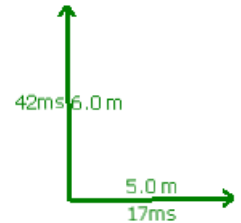
Overall relief is 7.8 ms/m

Timing

First hole start time	1000	ms
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☒ Open the blast segment at this point

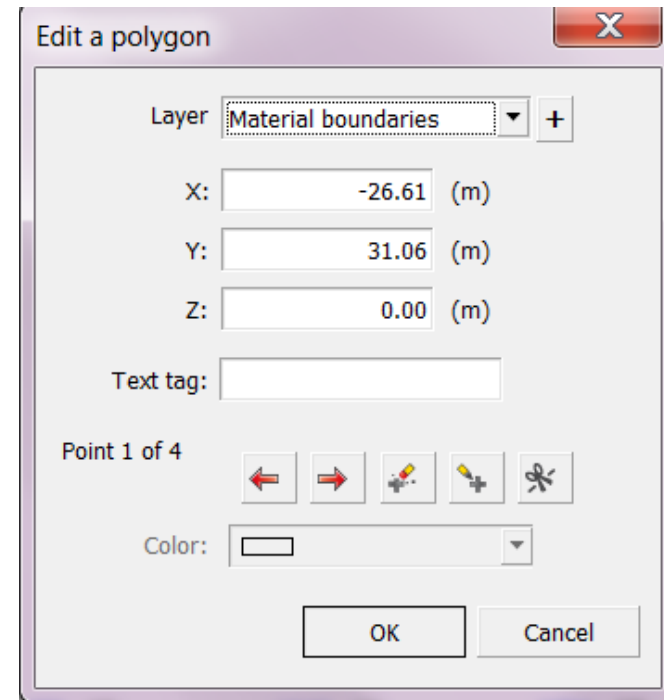
Apply OK Cancel



-

MATERIAL BOUNDARY

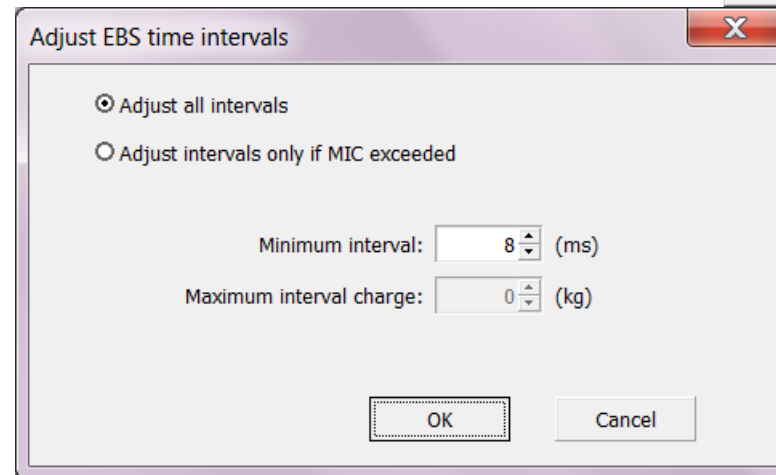
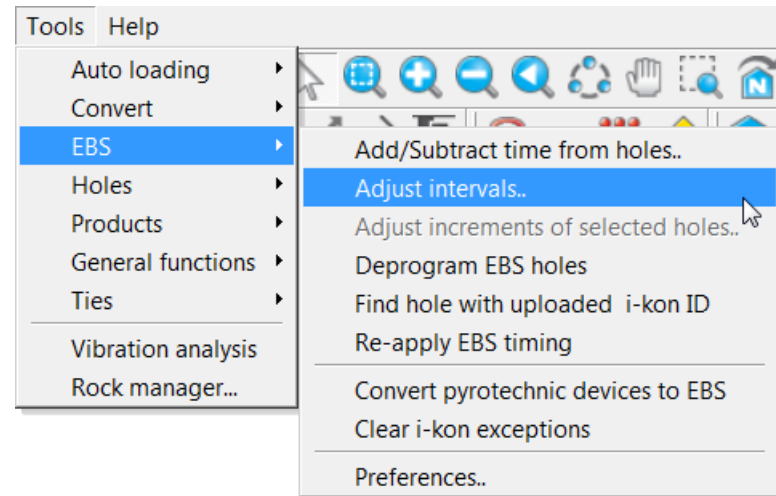
- **Draw** a polygon around the required **timing zone**
- Change polygon to **Material boundaries** layer



The screenshot shows the 'Edit a polygon' dialog box. It has a title bar with a close button (X). Inside, there is a 'Layer' dropdown menu set to 'Material boundaries' with a '+' button next to it. Below this are three input fields for coordinates: 'X:' with the value '-26.61 (m)', 'Y:' with the value '31.06 (m)', and 'Z:' with the value '0.00 (m)'. There is a 'Text tag:' input field. Below that, it says 'Point 1 of 4' followed by five icons: a left arrow, a right arrow, a point with a cross, a point with a plus, and a point with a star. At the bottom, there is a 'Color:' dropdown menu and two buttons: 'OK' and 'Cancel'.

ADJUST INTERVALS

- Adjusts the timing intervals of a blast to a specified **time window**
- Adjusts timing intervals based on **charge weight**



EBS LEAD-IN TOOL

- Used to prepare logging plans
- Add to starting hole
- Select logger #
- Add description



Add new EBS lead-in

☒ Logger 1
☐ Logger 2
☐ Logger 3
☐ Logger 4
☐ Logger 5
☐ Logger 6
☐ Logger 7
☐ Logger 8

Logger type: I-kon logger 1

Description: Row A

OK Cancel

1171 C1 1146 C2 1122 C3 1098 C4 1073 C5 1049 C6 1024 C7 1000 C8 1024 C9 1049 C10

1193 B1 1170 B2 1147 B3 1123 B4 1100 B5 1077 B6 1054 B7 1054 B8 1078 B9 1103 B10

1257 A1 1234 A2 1210 A3 1187 A4 1164 A5 1141 A6 1118 A7 1095 A8 1118 A9 1142 A10

1247 A1 1224 A2 1200 A3 1177 A4 1154 A5 1131 A6 1108 A7 1085 A8 1108 A9 1132 A10

- Adds ***Harness Wire*** to the plan
- Provides **hole allocation** to loggers
- Calculates detonators per logger
- Creates a **logging path** for Printout or Logger download



Select surface IS device

☐ Signal tube
☐ Detonating cord delay
☐ Detonating cord
☐ Electric
☒ **Harness wire**
☐ EBS detonators
☐ User defined delay

Product selection

Product family
Wire

Delay
N/A

OK Cancel

1171 C1>.....1146 C2>.....1122 C3>.....1098 C4>.....1073 C5>.....1049 C6 ...

L2
10

1193 B1<.....1170 B2<.....1147 B3<.....1123 B4<.....1100 B5<.....1

1257 A1>.....1234 A2>.....1210 A3>.....1187 A4>.....1164 A5>.....1141 A6 ...

1247 A1>.....1224 A2>.....1200 A3>.....1177 A4>.....1154 A5>.....1131 A6 ...

L1
30

LOGGING PLANS

- Logging reports can be printed
- Logging tables can be downloaded to Loggers for SHOTPlus logging mode.

EBS logging summary

i-kon logger **L1** i-kon logger model **i-kon logger I** COM3 ... ☒ Export to Logger ☐ Import from Logger

#Logged dets 0 #Listed dets 30

#	Row	Hole	Det	Delay	Det ID	Status	Flag
1	A	1	1	1247	?	Not tested	Not Logged
2	A	1	2	1257	?	Not tested	Not Logged
3	A	2	1	1224	?	Not tested	Not Logged
4	A	2	2	1234	?	Not tested	Not Logged
5	A	3	1	1200	?	Not tested	Not Logged
6	A	3	2	1210	?	Not tested	Not Logged
7	A	4	1	1177	?	Not tested	Not Logged
8	A	4	2	1187	?	Not tested	Not Logged
9	A	5	1	1154	?	Not tested	Not Logged
10	A	5	2	1164	?	Not tested	Not Logged
11	A	6	1	1131	?	Not tested	Not Logged
12	A	6	2	1141	?	Not tested	Not Logged
13	A	7	1	1108	?	Not tested	Not Logged
14	A	7	2	1118	?	Not tested	Not Logged

Logger Report Logger L1

Mine Location

file for sp training materials.spf (Rev. 120) Page 1 of 2

Number dets: 30	Harness length (m) 132.9		
Name	Date	Time	Start
Actual # dets logged	Leakage	Errors	End
Harness wire used			
Comments			

Hole ID	Det	Delay (ms)	Incr	Position on harness	Verify delay	Comments
A1	1	1247				
	2	1257	+10			
A2	1	1224	-33			
	2	1234	+10			
A3	1	1200	-34			
	2	1210	+10			
A4	1	1177	-33			
	2	1187	+10			
A5	1	1154	-33			
	2	1164	+10			
A6	1	1131	-33			
	2	1141	+10			
A7	1	1108	-33			
	2	1118	+10			
A8	1	1085	-33			
	2	1095	+10			
A9	1	1108	+13			
	2	1118	+10			

EBSDownloadikon.en

LOGGING & BLASTING RECORDS



- Records can be up-loaded from Loggers
- Logger & records can be printed or saved with the file

#	Hole ID	Detonator	Delay (ms)	Det ID	Status	Exception
1	V1	1	1000	267C4E19	Det Programmed	
2		2	1067	25550E5E	Det Programmed	
3	V2	1	1076	267C59E4	Det Programmed	
4		2	1143	25550E60	Det Programmed	
5	V3	1	1149	267C4E2F	Det Programmed	
6		2	1216	25550E58	Det Programmed	

EBS firing summary							
i-kon logger		L8	#Connected dets 188		Upload	COM3	Preview
					Print All	Close	
#	Row	Hole	Det	Delay	Det ID	Flag	Status
1	N	13	1		1192 3BAED	OK	Det Programmed
2	M	1	1		1190 347B2	OK	Det Programmed
3	M	2	1		1150 34B40	OK	Det Programmed
4	M	3	1		1120 3B133	OK	Det Programmed
5	M	4	1		1072 33C19	OK	Det Programmed
6	M	4	2		1070 34496	OK	Det Programmed
7	M	5	1		1064 33FF2	OK	Det Programmed
8	M	5	2		1062 34646	OK	Det Programmed
9	M	6	1		1009 34613	OK	Det Programmed
10	M	7	1		1004 347DF	OK	Det Programmed
11	M	8	1		1012 33C29	OK	Det Programmed
12	M	8	0		1014 34592	Extra Det	Det Programmed
13	M	9	1		1077 33C2E	OK	Det Programmed
14	M	9	2		1075 354SD	OK	Det Programmed

Abort always

Fired: 30.Nov.16 am 10:21:12

Loggers: 8 Total dets: 707

LOGGER ID: 1	DETS: 83	ERRORS: 0	Current: 1.1 mA	SN: 001254	Version: 05.22k
LOGGER ID: 2	DETS: 86	ERRORS: 0	Current: 1.3 mA	SN: 002925	Version: 05.22k
LOGGER ID: 3	DETS: 87	ERRORS: 0	Current: 1.1 mA	SN: 000831	Version: 05.22k
LOGGER ID: 4	DETS: 91	ERRORS: 0	Current: 1.3 mA	SN: 002952	Version: 05.22k
LOGGER ID: 5	DETS: 89	ERRORS: 0	Current: 1.2 mA	SN: 003153	Version: 05.22k
LOGGER ID: 6	DETS: 89	ERRORS: 0	Current: 1.8 mA	SN: 003152	Version: 05.22k
LOGGER ID: 7	DETS: 89	ERRORS: 0	Current: 5.6 mA	SN: 001653	Version: 05.22k
LOGGER ID: 8	DETS: 93	ERRORS: 0	Current: 4.5 mA	SN: 002768	Version: 05.22k

by ORICA

Finished upload