WEBVTT

1
00:00:17.675 --> 00:00:18.205
Good morning.

2
00:00:18.755 --> 00:00:21.045
Welcome. Thanks for being here.

3
00:00:21.865 --> 00:00:26.845
Um, as, uh, Colin just gave us a nice introduction.

4
00:00:27.345 --> 00:00:28.345
Um,

5
00:00:28.595 --> 00:00:30.105
Let's see if we get back to work,

6
00:00:35.415 --> 00:00:36.415
There's my advance.

7
00:00:36.415 --> 00:00:39.945
Okay. I'm Dan Boorman, a production test pilot, uh,

8
00:00:40.205 --> 00:00:42.585
at Boeing, a Boeing Engineering Technical Fellow.

9
00:00:43.405 --> 00:00:46.385
Um, in my areas of expertise, uh,

10
00:00:46.385 --> 00:00:48.865
over my Boeing career in human factors,

11
00:00:48.885 --> 00:00:52.905
flight crew training, flight tech design, uh, safety

12
00:00:53.705 --> 00:00:56.425
research, and, uh, and flight test.

13
00:00:57.125 --> 00:00:59.545
Um, bill, I'll let you introduce yourself. Okay,

14
00:01:00.165 --> 00:01:01.165
Thanks Dan.

15
00:01:01.215 --> 00:01:03.665
Yeah, my name is Bill Higgins, as Colin said,

16
00:01:03.725 --> 00:01:05.225
and I've been working with Dan

17
00:01:05.445 --> 00:01:08.185
for about five years on checklist development.

18
00:01:08.765 --> 00:01:11.145
And while you're gonna hear later about some

19
00:01:11.145 --> 00:01:13.665
of the areas Dan has worked in as far as checklists,

20
00:01:13.785 --> 00:01:17.825
I have worked primarily internally in Boeing and Boeing Test

21
00:01:17.825 --> 00:01:19.065
and Development BTE,

22
00:01:19.525 --> 00:01:22.105
and with a variety of test labs, including

23
00:01:22.625 --> 00:01:26.385
materials testing, wind tunnel testing, full scale F 16

24
00:01:26.385 --> 00:01:28.105
and commercial airplane testing,

25
00:01:28.805 --> 00:01:30.745
and have seen a variety

26
00:01:30.805 --> 00:01:33.065
of checklists come out of those collaborations.

27
00:01:33.435 --> 00:01:36.065

Lemme just give you a sample of what some of those are.

28
00:01:36.665 --> 00:01:39.705
Actuator calibration checklist, critical lift

29
00:01:39.705 --> 00:01:43.465
and move checklist, hazardous materials, ordinance test,

30
00:01:43.855 --> 00:01:47.145
electronics integrity, robotics pre-operation.

31
00:01:53.405 --> 00:01:56.905
So you are pilots and flight test experts.

32
00:01:57.225 --> 00:01:59.185
A little bit different audience than I have.

33
00:01:59.485 --> 00:02:02.505
Uh, typically worked with, as Bill mentioned,

34
00:02:02.505 --> 00:02:06.825
these were all lab and test functions within Boeing.

35
00:02:07.485 --> 00:02:11.825
Uh, I've also worked with doctors, firefighters,

36
00:02:12.845 --> 00:02:15.065
uh, commercial fishing ship captains

37
00:02:15.085 --> 00:02:17.905
and others on developing checklists

38
00:02:17.905 --> 00:02:19.785
for those, uh, industries.

39
00:02:20.365 --> 00:02:22.345
And those are people who really don't know

40
00:02:22.345 --> 00:02:23.465
that much about checklists.

41
00:02:23.465 --> 00:02:25.345
When we start, you're a different audience

42
00:02:25.345 --> 00:02:28.465
because you are essentially expert users in checklists

43
00:02:28.655 --> 00:02:32.825
already, But to know how

44
00:02:32.825 --> 00:02:35.505
to use checklists and what your exact opinion is

45
00:02:35.505 --> 00:02:37.425
of checklists, so what your experience is

46
00:02:37.425 --> 00:02:38.905
with checklist is two different things.

47
00:02:39.365 --> 00:02:42.025
So, in a minute, we're gonna ask you to think about

48
00:02:42.695 --> 00:02:45.265
what your experience with checklist is,

49
00:02:45.925 --> 00:02:47.745
how you feel about them, um,

50
00:02:48.605 --> 00:02:50.305
and, uh, we will have a chance

51
00:02:50.325 --> 00:02:51.985
to chat about that in just a minute.

52
00:02:52.685 --> 00:02:54.585
One thing we we're gonna do in this workshop,

53
00:02:54.585 --> 00:02:57.105
because it's a workshop, is form into small groups

54
00:02:57.845 --> 00:02:59.065

and do actual work.

55
00:02:59.745 --> 00:03:02.605
Uh, so I'm gonna have Bill get you started on

56
00:03:02.605 --> 00:03:06.085
that right away, so we can form into some groups, uh, get

57
00:03:06.085 --> 00:03:07.125
to know each other a little bit

58
00:03:07.625 --> 00:03:10.205
and, uh, get started, uh, with the workshop.

59
00:03:12.675 --> 00:03:14.445
Okay. Thanks, Dan. As Dan mentioned,

60
00:03:14.745 --> 00:03:18.125
you are all experts in using checklists.

61
00:03:18.785 --> 00:03:22.085
Our focus in this workshop is to introduce you

62
00:03:22.105 --> 00:03:23.205
to the concepts

63
00:03:23.305 --> 00:03:25.965
and practices of how to develop checklists,

64
00:03:25.965 --> 00:03:27.405
so they'll be effectively used.

65
00:03:27.945 --> 00:03:29.565
And to do that, we need to get you

66
00:03:29.565 --> 00:03:31.125
to start sharing one, one another.

67
00:03:31.465 --> 00:03:34.245
So as you see on the slides, I'd like each of you to share

68
00:03:34.985 --> 00:03:36.525
the first three within your groups.

69
00:03:36.615 --> 00:03:37.725
We'll talk about that in a minute.

70
00:03:38.185 --> 00:03:40.765
And then from the last four, pick one of those

71
00:03:41.395 --> 00:03:44.085
that is more typical of your experience,

72
00:03:44.475 --> 00:03:45.885
whether it's positive

73
00:03:45.885 --> 00:03:49.285
or negative, something that has influenced your mental model

74
00:03:49.285 --> 00:03:51.325
of what checklists are and how effective they are.

75
00:03:51.865 --> 00:03:54.125
You may have had a bad experience in trying

76
00:03:54.125 --> 00:03:56.725
to use a checklist that wasn't really put together

77
00:03:56.725 --> 00:03:59.285
that well, and so you didn't feel it added value.

78
00:03:59.945 --> 00:04:02.565
You may have had a, an experience

79
00:04:02.565 --> 00:04:04.365
where a checklist helped you

80
00:04:05.025 --> 00:04:07.885
in avoiding a critical error in whatever you were doing.

81
00:04:08.505 --> 00:04:12.085

You may have seen checklists that were really interruptions

82
00:04:12.185 --> 00:04:14.765
to the flow of activity that you were involved in,

83
00:04:15.385 --> 00:04:18.525
or you may have had a very enjoyable experience on team

84
00:04:18.525 --> 00:04:21.125
checklists where that contributed to team function

85
00:04:21.125 --> 00:04:25.365
and team building, and to the whole, um, activity

86
00:04:25.425 --> 00:04:27.165
of using checklists within your teams.

87
00:04:27.905 --> 00:04:30.445
So we want you to divide up into groups starting now.

88
00:04:30.825 --> 00:04:32.765
And then, as Dan mentioned, later on,

89
00:04:32.765 --> 00:04:34.285
when we get into the practices,

90
00:04:34.285 --> 00:04:36.005
you're gonna stay in those groups to work

91
00:04:36.005 --> 00:04:37.325
through the checklist builder.

92
00:04:37.905 --> 00:04:40.405
So the way to do that, the easiest way is for

93
00:04:40.955 --> 00:04:44.325
alternating tables to turn around to the table behind you

94
00:04:44.345 --> 00:04:47.165
and form groups of no more than six, about four to six,

95
00:04:47.665 --> 00:04:51.885
and then share the first three and one out of the last four.

96
00:04:52.185 --> 00:04:55.365
So you've got five minutes for your whole group to do this.

97
00:04:56.265 --> 00:04:59.365
So I know you're all test pilots, you like the opportunity

98
00:04:59.425 --> 00:05:02.485
to talk, but you're gonna have to really control that today.

99
00:05:02.755 --> 00:05:04.845
Okay. So go ahead, move into your groups

100
00:05:05.225 --> 00:05:06.445
and then we'll get started on.

101
00:05:06.505 --> 00:05:07.505
So

102
00:05:08.675 --> 00:05:10.645
What, hello?

103
00:05:14.035 --> 00:05:15.405
Yeah, if I could have your attention.

104
00:05:23.195 --> 00:05:26.725
Okay, well I'll wrap that up. Yep.

105
00:05:27.025 --> 00:05:30.725
You're all talkers. Okay.

106
00:05:32.245 --> 00:05:34.005
I know you all have stories to share.

107
00:05:34.955 --> 00:05:37.085
Obviously we don't have time for everyone

108
00:05:37.105 --> 00:05:39.365

to share their story, but we'd like to have two

109
00:05:39.385 --> 00:05:41.445
or three people speak up

110
00:05:41.465 --> 00:05:44.005
and share your experience with checklists.

111
00:05:44.005 --> 00:05:46.525
And I think, Claude, do you have a remote mic

112
00:05:46.525 --> 00:05:47.605
back there that they can use?

113
00:05:48.605 --> 00:05:50.605
I think it's still up there. It's up right there.

114
00:05:55.315 --> 00:05:56.685
Okay. Who'd like to be the first

115
00:05:56.705 --> 00:06:00.865
to share your story right back in the back?

116
00:06:02.965 --> 00:06:04.145
Please keep it brief

117
00:06:04.765 --> 00:06:07.465
so we can hear a couple people and then we'll move on.

118
00:06:09.055 --> 00:06:12.305
Yeah. Uh, the three of us back here, uh, are all on crew.

119
00:06:12.655 --> 00:06:14.065
Crew at aircraft backgrounds,

120
00:06:14.965 --> 00:06:19.225
and, um, especially in, in, uh, my bomber background,

121
00:06:19.805 --> 00:06:21.465
um, the whole crew is involved in,

122
00:06:21.465 --> 00:06:22.585
for instance, the bomber run checklist.

123
00:06:23.405 --> 00:06:26.865
And, uh, as it was interesting to just think through it

124
00:06:26.865 --> 00:06:29.425
and develop it and, and what I came up with was

125
00:06:29.425 --> 00:06:32.105
that it was like a song that we sang ah, um,

126
00:06:32.175 --> 00:06:34.505
because it orchestrates all of our activity

127
00:06:34.565 --> 00:06:35.625
and it puts it all in order

128
00:06:35.645 --> 00:06:37.465
and it avoids chaos like Harry said.

129
00:06:37.525 --> 00:06:39.625
So, uh, it's been a positive experience

130
00:06:39.625 --> 00:06:40.785
with checklists for, for us.

131
00:06:41.335 --> 00:06:43.865
Cool. Great. Thank you. We're gonna have a singing later.

132
00:06:46.335 --> 00:06:48.745
Okay. Who else? There was somebody up here had your hand up?

133
00:06:50.525 --> 00:06:51.745
Oh, right up here, Colin

134
00:06:53.405 --> 00:06:54.405
Making Me move. Second

135
00:06:54.405 --> 00:06:55.325

row

136
00:07:02.155 --> 00:07:03.155
Check.

137
00:07:03.285 --> 00:07:05.745
Hi, uh, John Lindsay. I work for Boeing.

138
00:07:06.245 --> 00:07:08.265
Um, I'm a V 22 test bot here at Pax River.

139
00:07:08.845 --> 00:07:10.265
Um, we, my group up here

140
00:07:10.265 --> 00:07:13.785
where we're just discussing more probably bad checklist,

141
00:07:13.895 --> 00:07:17.505
high stress situation, uh, what we came up

142
00:07:17.505 --> 00:07:21.145
with was something we've all experienced where, uh,

143
00:07:21.245 --> 00:07:23.385
we have two separate checklists actually.

144
00:07:23.565 --> 00:07:25.625
So, um, when we're going out there,

145
00:07:25.645 --> 00:07:28.465
we have our natops checklist that's approved

146
00:07:28.465 --> 00:07:32.265
for the aircraft we fly in, uh, and that starts to play

147
00:07:32.265 --> 00:07:33.385
and gets us operating safely.

148
00:07:33.485 --> 00:07:35.305
Of course, everyone knows that.

149
00:07:35.565 --> 00:07:38.785
But we also have, what is prepared by engineering

150
00:07:39.365 --> 00:07:40.545
is a flight test checklist.

151
00:07:41.045 --> 00:07:42.465
And we have to bounce back

152
00:07:42.485 --> 00:07:45.385
and forth between those two checklists, um,

153
00:07:46.345 --> 00:07:49.385
probably 10 times while we're starting the airplane,

154
00:07:49.715 --> 00:07:50.905
while we're out there flying

155
00:07:50.905 --> 00:07:52.225
around while we're landing the aircraft.

156
00:07:52.525 --> 00:07:54.185
And that can be problematic.

157
00:07:54.645 --> 00:07:58.545
Um, just situation for me that sometimes happens.

158
00:07:58.885 --> 00:08:01.625
Uh, you know, I fly the between two, uh, two, uh,

159
00:08:01.625 --> 00:08:04.745
dual pilot aircraft, but I'll go down the na top checklist

160
00:08:04.845 --> 00:08:06.185
and I have to put my finger on the checklist

161
00:08:06.645 --> 00:08:09.985
and bounce over to the flight test checklist,

162
00:08:09.995 --> 00:08:11.505

which is prepared by engineering.

163
00:08:12.165 --> 00:08:14.225
And sometimes you get going down on that checklist

164
00:08:14.365 --> 00:08:17.345
and you forget where you left off on the knee top checklist

165
00:08:17.445 --> 00:08:19.145
and, and perhaps maybe skip steps.

166
00:08:19.925 --> 00:08:21.865
Uh, that's happened to me before in non-critical areas

167
00:08:22.685 --> 00:08:25.745
and in other areas that maybe are more critical,

168
00:08:25.815 --> 00:08:27.505
like, okay, let's go flying.

169
00:08:27.565 --> 00:08:31.345
Oh, forgot the engine. One of the engines is not running.

170
00:08:31.525 --> 00:08:34.785
So you have to constantly be reviewing and going back

171
00:08:34.785 --> 00:08:37.905
and forth, and the, the construct of a checklist is designed

172
00:08:37.905 --> 00:08:40.105
for you to go step by step so you don't forget things.

173
00:08:40.165 --> 00:08:43.785
And so in flight tests, I think we, we have, uh,

174
00:08:43.925 --> 00:08:46.665
we run into those things where the checklists

175
00:08:46.685 --> 00:08:47.745
and dual checklists,

176
00:08:47.745 --> 00:08:50.265
merging the checklists in your own mind.

177
00:08:50.545 --> 00:08:52.505
'cause you don't, definitely don't have, you know,

178
00:08:52.705 --> 00:08:53.825
'cause every test is different.

179
00:08:54.085 --> 00:08:55.725
You have to do things different and never test.

180
00:08:55.745 --> 00:08:58.165
So it's impossible almost to merge, uh,

181
00:08:58.635 --> 00:09:01.405
your normal checklist with your, your flight test checklist.

182
00:09:01.545 --> 00:09:03.885
So that's, that's what we were discussing

183
00:09:03.995 --> 00:09:04.995
Here. Good. Thanks, John.

184
00:09:04.995 --> 00:09:06.445
Actually, that's one

185
00:09:06.445 --> 00:09:08.645
of the biggest problems in contributing

186
00:09:08.645 --> 00:09:10.845
to accidents is losing your place in checklists.

187
00:09:11.425 --> 00:09:14.485
And because of that, things happen you had not anticipated,

188
00:09:14.745 --> 00:09:16.405
and then you're in a world of hurt.

189
00:09:16.785 --> 00:09:21.045

One more call. Yep. Get you running around.

190
00:09:31.025 --> 00:09:33.885
Uh, good morning. Malcolm Ridley, uh, Airbus Test Pilot.

191
00:09:34.665 --> 00:09:36.885
And I think, like we completely agree,

192
00:09:37.155 --> 00:09:39.005
there's at least two levels of checklist.

193
00:09:39.195 --> 00:09:40.845
There's the checklist for the aircraft.

194
00:09:40.845 --> 00:09:41.965
There's a flight test checklist,

195
00:09:42.415 --> 00:09:45.245
which we would normally put in our test order at Airbus.

196
00:09:46.065 --> 00:09:48.605
Um, but in my experience, there's actually a third level,

197
00:09:48.605 --> 00:09:50.365
which is the personal checklist.

198
00:09:51.225 --> 00:09:53.845
And I wonder if that's valid for this discussion as well,

199
00:09:53.845 --> 00:09:57.765
because, um, I had an event, um, 20 years ago,

200
00:09:57.765 --> 00:09:59.685
flight testing at Canberra, believe it

201
00:09:59.685 --> 00:10:02.525
or not, in a previous life, about to do a stall test.

202
00:10:02.745 --> 00:10:05.325
And my own mental checklist of configuration just

203
00:10:05.325 --> 00:10:06.525
before the test point revealed,

204
00:10:06.605 --> 00:10:07.685
I still had the speed brake out,

205
00:10:07.685 --> 00:10:10.085
which would've been rather nasty in that airplane.

206
00:10:10.865 --> 00:10:15.125
So yeah, combining production, if you like,

207
00:10:15.325 --> 00:10:18.085
aircraft level checklists, flight test checklists,

208
00:10:18.465 --> 00:10:21.725
but also I think our own inbuilt checklist is,

209
00:10:21.725 --> 00:10:22.765
is worth thinking about as well.

210
00:10:23.315 --> 00:10:25.565
Good. Thank you. Malcolm. Yeah,

211
00:10:25.565 --> 00:10:30.485
Malcolm, uh, uh, you know what, we look at checklists as,

212
00:10:30.545 --> 00:10:32.845
as written on paper or on cards,

213
00:10:33.545 --> 00:10:38.525
but there are internal verbal routines that we have, uh,

214
00:10:38.525 --> 00:10:41.165
that are just as legitimate, you know, as checklists.

215
00:10:41.305 --> 00:10:42.485
So that's a, that's a

216
00:10:42.485 --> 00:10:44.285

Really good, in fact, some of those qualify

217
00:10:44.425 --> 00:10:46.005
as human factors checklists.

218
00:10:46.345 --> 00:10:47.925
And while you have technical checklist,

219
00:10:48.745 --> 00:10:50.245
as Malcolm is referring to,

220
00:10:50.245 --> 00:10:54.685
the human factor side is often a big causation of problems.

221
00:10:55.265 --> 00:10:56.965
And to not acknowledge that

222
00:10:57.145 --> 00:10:59.605
and to use that effectively is

223
00:10:59.605 --> 00:11:00.645
something we need to learn to do.

224
00:11:03.195 --> 00:11:04.765
Okay, thanks for those, those are,

225
00:11:05.095 --> 00:11:06.605
those are great stories.

226
00:11:08.105 --> 00:11:12.525
Um, so you are users of checklists,

227
00:11:13.625 --> 00:11:17.405
and the question now is, what's this workshop all about?

228
00:11:18.335 --> 00:11:19.445
We've got a group here that really

229
00:11:19.445 --> 00:11:20.525
knows how to use checklists.

230
00:11:20.665 --> 00:11:22.525
And a checklist is a simple tool.

231
00:11:22.555 --> 00:11:26.485
It's really not rocket scientists, rocket science to, uh,

232
00:11:26.865 --> 00:11:28.805
to create, develop new checklists.

233
00:11:29.265 --> 00:11:32.165
But you can screw it up and it has been done.

234
00:11:32.765 --> 00:11:36.045
A well designed checklist is highly effective in the

235
00:11:36.045 --> 00:11:37.245
environment it's designed for,

236
00:11:37.625 --> 00:11:40.685
but a poorly designed checklist can be confusing.

237
00:11:41.545 --> 00:11:42.965
It can lead to errors.

238
00:11:43.045 --> 00:11:45.125
A checklist is a tool that should prevent errors,

239
00:11:45.345 --> 00:11:47.125
but checklists can actually contribute

240
00:11:47.125 --> 00:11:48.645
to errors if they're not well designed,

241
00:11:48.945 --> 00:11:51.205
or if the combination of checklists that you're dealing

242
00:11:51.205 --> 00:11:52.805
with doesn't work well together.

243
00:11:53.625 --> 00:11:57.805

Uh, and the really the worst outcome sometimes in the long

244
00:11:57.805 --> 00:12:00.005
run is that use is discouraged.

245
00:12:00.505 --> 00:12:03.005
Now we are in an environment, in a flight deck where we are,

246
00:12:03.035 --> 00:12:05.685
there's a high expectation we're gonna use checklists.

247
00:12:05.835 --> 00:12:08.245
It's not really an option to not do it most of the time.

248
00:12:08.905 --> 00:12:11.325
Uh, but in other environments out there in the world,

249
00:12:11.855 --> 00:12:13.685
there are people who, hey, you know, I,

250
00:12:13.885 --> 00:12:15.005
I don't really want to use this checklist.

251
00:12:15.105 --> 00:12:17.165
Or if you create a checklist for more of the, uh,

252
00:12:17.175 --> 00:12:18.485
other test environments

253
00:12:18.785 --> 00:12:20.245
that's not really in the flight deck,

254
00:12:20.615 --> 00:12:23.405
users may have the choice of simply ignoring the checklist

255
00:12:23.865 --> 00:12:26.045
and a poorly designed checklist won't be used.

256
00:12:27.385 --> 00:12:30.925
So what this workshop is all about is taking expert users

257
00:12:30.945 --> 00:12:34.285
of checklists and making you into developers of checklists.

258
00:12:34.285 --> 00:12:35.405
That's what we'll be doing today.

259
00:12:38.995 --> 00:12:41.605
Okay. And the things we're going to look at today

260
00:12:41.785 --> 00:12:43.285
to get us all on the same page,

261
00:12:43.385 --> 00:12:45.325
we wanna look a little bit at the history of checklist.

262
00:12:45.545 --> 00:12:47.445
How do they get started, especially in aviation.

263
00:12:47.905 --> 00:12:49.485
We haven't always used checklist,

264
00:12:50.105 --> 00:12:51.645
but there was a turning point

265
00:12:51.895 --> 00:12:54.205
where it became absolutely necessary.

266
00:12:54.665 --> 00:12:56.125
And it's a fascinating story.

267
00:12:56.125 --> 00:12:57.525
Many of you probably already know it,

268
00:12:57.525 --> 00:12:59.725
but it's always a good point to touch on.

269
00:13:00.115 --> 00:13:01.765
Then we're gonna talk about the different types

270
00:13:01.785 --> 00:13:03.685

of checklist, depending on the situation,

271
00:13:03.685 --> 00:13:06.685
depending on the use that you intend to, um,

272
00:13:06.835 --> 00:13:08.525
implement your checklist in.

273
00:13:08.905 --> 00:13:10.685
You want to consider the different types

274
00:13:10.705 --> 00:13:12.205
and formats of checklists.

275
00:13:12.635 --> 00:13:16.485
Then, as Dan was saying, the primary focus is today in how

276
00:13:16.485 --> 00:13:17.565
to develop a checklist.

277
00:13:18.145 --> 00:13:20.365
And we're gonna walk through a series of steps

278
00:13:20.795 --> 00:13:22.645
that will give you understanding

279
00:13:22.665 --> 00:13:25.365
and knowledge about how to pull together a checklist

280
00:13:25.515 --> 00:13:26.805
that will actually be used.

281
00:13:27.665 --> 00:13:30.005
One of the problems with checklist is

282
00:13:30.005 --> 00:13:32.125
that people involved in designing

283
00:13:32.125 --> 00:13:34.605
and developing them may not actually be users,

284
00:13:35.425 --> 00:13:37.925
and it's much better if the people that are going

285
00:13:37.925 --> 00:13:40.645
to use the checklist are also involved in the design

286
00:13:40.645 --> 00:13:41.885
and development of the checklist,

287
00:13:41.885 --> 00:13:43.605
because they'll think differently about

288
00:13:43.605 --> 00:13:46.245
what should be included and how it should be formatted.

289
00:13:46.745 --> 00:13:49.205
But that's one of the big things is what do you include?

290
00:13:49.205 --> 00:13:50.325
What do you not include,

291
00:13:50.325 --> 00:13:52.365
and how do you decide what all those questions are?

292
00:13:52.945 --> 00:13:54.525
And then as we have time,

293
00:13:54.865 --> 00:13:57.285
and hopefully we will have time, Dan's gonna check on

294
00:13:57.545 --> 00:14:00.125
or gonna share a little bit about electronic checklists

295
00:14:00.225 --> 00:14:01.765
and how those came into being

296
00:14:01.825 --> 00:14:04.085
and how they differ from paper-based checklist.

297
00:14:04.905 --> 00:14:06.965

So Dan's gonna start by giving us a little bit

298
00:14:06.965 --> 00:14:09.005
of the background and history of checklists.

299
00:14:14.485 --> 00:14:17.805
Aviation did not actually always use checklists.

300
00:14:18.185 --> 00:14:20.885
Uh, in the beginning days,

301
00:14:21.105 --> 00:14:24.005
the airplanes were extremely simple, uh,

302
00:14:24.185 --> 00:14:28.805
and even into the 1920s, uh, we were still using

303
00:14:29.435 --> 00:14:33.205
primarily single engine fabric color, uh, covered by planes,

304
00:14:33.745 --> 00:14:35.285
and the airplanes were simple

305
00:14:35.385 --> 00:14:36.925
and checklists were not in wide use.

306
00:14:37.315 --> 00:14:39.885
I've seen some examples of checklists that were developed

307
00:14:40.145 --> 00:14:43.565
by the early airlines in the, in the mid 1920s,

308
00:14:44.025 --> 00:14:46.165
but their use was pretty, uh, rare.

309
00:14:46.605 --> 00:14:50.285
Actually. When we get into the 1930s now,

310
00:14:50.285 --> 00:14:52.685
we're in multi-engine aluminum airplanes,

311
00:14:53.085 --> 00:14:56.365
retractable landing gear flaps, controllable propellers.

312
00:14:56.895 --> 00:14:59.285
We're into much more sophisticated airplanes,

313
00:14:59.625 --> 00:15:01.605
but still, checklist use was rare.

314
00:15:01.985 --> 00:15:05.125
And if there's any one turning point in the history

315
00:15:05.125 --> 00:15:08.205
of checklists, it happened in 1935

316
00:15:08.355 --> 00:15:10.765
with the Boeing Model 2 99.

317
00:15:11.495 --> 00:15:14.605
There was a competition for a new long range bomber

318
00:15:14.985 --> 00:15:16.645
by the US Army Air Corps,

319
00:15:17.625 --> 00:15:21.045
and the Boeing entry was the, uh, the model 2 99.

320
00:15:21.395 --> 00:15:25.245
Douglas and Martin were the other two main competitors, uh,

321
00:15:25.385 --> 00:15:26.565
in that competition.

322
00:15:27.145 --> 00:15:29.925
But the model 2 99 was heavily favored.

323
00:15:30.025 --> 00:15:34.045
It had higher, uh, max altitude, better range,

324
00:15:34.265 --> 00:15:37.525

and much higher, uh, weight carrying capacity.

325
00:15:38.105 --> 00:15:41.325
And the airplane was, they were all in a, uh,

326
00:15:41.645 --> 00:15:43.205
a fly off in October

327
00:15:43.865 --> 00:15:47.125
or flight demonstration in October of 1935.

328
00:15:47.665 --> 00:15:50.565
And the Boeing Model 2 99 was heavily favored.

329
00:15:50.565 --> 00:15:52.605
It was essentially a formality

330
00:15:53.065 --> 00:15:54.845
to do the flying demonstration.

331
00:15:57.785 --> 00:16:00.805
The pilot for Boeing was Leslie Tower,

332
00:16:01.465 --> 00:16:03.725
and he had been the project pilot on the airplane,

333
00:16:03.745 --> 00:16:06.965
so he was a deep expert in this airplane.

334
00:16:07.505 --> 00:16:09.325
Um, the other, uh,

335
00:16:09.425 --> 00:16:12.645
on in the left seat was a major PLU hill

336
00:16:12.905 --> 00:16:14.365
who had not flown the airplane

337
00:16:14.365 --> 00:16:18.725
before, uh, was the, uh, was a chief pilot in the, uh,

338
00:16:19.065 --> 00:16:21.245
in the army, and then in the right seat.

339
00:16:21.705 --> 00:16:24.805
The pilot was the project pilot for the Army

340
00:16:24.905 --> 00:16:27.005
who had flown the airplane a number of times before.

341
00:16:27.185 --> 00:16:30.645
So you had a lot of expertise in the flight deck on the,

342
00:16:30.785 --> 00:16:32.205
on the operation of the airplane.

343
00:16:33.945 --> 00:16:37.725
The airplane taxied out, took off, pitched up,

344
00:16:38.275 --> 00:16:39.845
stalled, and crashed.

345
00:16:42.335 --> 00:16:46.115
The three pilots in the front ended up dying from their

346
00:16:46.755 --> 00:16:48.875
injuries, and the two engineers who were in the back

347
00:16:48.875 --> 00:16:50.955
of the airplane survived the crash

348
00:16:51.385 --> 00:16:53.075
because the airplane crashed.

349
00:16:53.735 --> 00:16:57.315
The, uh, competition they were Boeing was automatically

350
00:16:57.315 --> 00:16:58.795
eliminated from the competition.

351
00:16:59.345 --> 00:17:01.075

Douglas, uh,

352
00:17:01.935 --> 00:17:04.635
won the co won the competition after that.

353
00:17:05.575 --> 00:17:09.315
And the, uh, press of course once, well, first of all,

354
00:17:09.315 --> 00:17:10.435
there was an investigation

355
00:17:10.975 --> 00:17:14.355
and they found that the pilots had failed to release the,

356
00:17:14.375 --> 00:17:15.795
uh, flight control Gus Lock.

357
00:17:16.145 --> 00:17:18.595
Okay. Gus Lock is obviously gonna protect the flight

358
00:17:18.595 --> 00:17:19.875
controls on the ground.

359
00:17:20.585 --> 00:17:23.275
They had also not done a flight control check

360
00:17:23.375 --> 00:17:25.995
before the takeoff, so they managed to take off

361
00:17:25.995 --> 00:17:27.795
with the Gus lock engaged.

362
00:17:27.935 --> 00:17:30.075
Uh, it was recognized during the climb,

363
00:17:30.095 --> 00:17:33.715
but by the time, um, they could release it, it was too late.

364
00:17:33.715 --> 00:17:34.915
The airplane had already stalled.

365
00:17:36.855 --> 00:17:39.875
So when the press got ahold of this, the conclusion was,

366
00:17:40.215 --> 00:17:43.355
we have too much airplane for one man to fly.

367
00:17:43.355 --> 00:17:46.475
Those were the headlines in the public's view.

368
00:17:46.765 --> 00:17:48.915
Technology had crossed a line.

369
00:17:49.805 --> 00:17:51.485
Airplanes were now too complex

370
00:17:51.985 --> 00:17:53.445
and humans were not able

371
00:17:53.465 --> 00:17:55.445
to effectively operate them anymore.

372
00:17:58.025 --> 00:18:00.645
But what the Boeing team concluded was something a little

373
00:18:00.645 --> 00:18:03.285
bit different, and they may not have put it in these exact

374
00:18:03.285 --> 00:18:05.405
words, but the way we would say it today is

375
00:18:06.155 --> 00:18:10.125
that we have too much complexity to depend on human memory.

376
00:18:11.065 --> 00:18:12.765
The airplane is flyable,

377
00:18:12.985 --> 00:18:15.445
but we shouldn't be just depending on memory in order

378
00:18:15.465 --> 00:18:17.525

to operate it because of the complexity.

379
00:18:18.745 --> 00:18:22.685
So through the, uh, the, uh, oddities of the

380
00:18:23.565 --> 00:18:26.245
contract process, there was a second competition.

381
00:18:26.665 --> 00:18:28.645
Boeing had a second shot at it,

382
00:18:29.105 --> 00:18:31.725
and the Boeing team developed a set of normal checklists

383
00:18:31.725 --> 00:18:35.885
by phase of flight, four checklists, just the critical items

384
00:18:36.305 --> 00:18:39.365
to check before you go to the next critical phase of flight.

385
00:18:40.135 --> 00:18:42.125
There was an, uh, a second competition.

386
00:18:42.305 --> 00:18:43.885
Boeing won the contract

387
00:18:44.385 --> 00:18:47.085
and the model 2 99 became the B 17

388
00:18:47.595 --> 00:18:51.285
with over 12,700 of these airplanes built

389
00:18:51.425 --> 00:18:55.245
and obviously, uh, an important factor in World War ii.

390
00:18:57.715 --> 00:18:59.215
So what are the lessons from this?

391
00:18:59.315 --> 00:19:01.335
We had pilots who were highly trained.

392
00:19:01.965 --> 00:19:04.495
They had the knowledge, they had the skills,

393
00:19:05.875 --> 00:19:09.015
but they failed to correctly execute the procedures

394
00:19:09.015 --> 00:19:10.135
they needed to execute.

395
00:19:12.025 --> 00:19:15.165
The operational environment was complex procedures.

396
00:19:15.915 --> 00:19:19.085
They're operating in a team which adds automatically adds

397
00:19:19.085 --> 00:19:21.045
complexity to the environment.

398
00:19:21.705 --> 00:19:22.925
And it was high stress.

399
00:19:23.035 --> 00:19:25.965
This is a very familiar set of operational,

400
00:19:26.345 --> 00:19:28.285
of an operational environment for all of us.

401
00:19:30.835 --> 00:19:35.655
The human factors that we are all subject to is the effects

402
00:19:35.655 --> 00:19:37.975
of interruptions and distractions are,

403
00:19:38.035 --> 00:19:40.615
memory is not perfect, we're human beings.

404
00:19:41.275 --> 00:19:43.695
And then there's the inattention that we get.

405
00:19:44.355 --> 00:19:48.175

Now, high automation context was not a factor on the model

406
00:19:48.235 --> 00:19:50.695
2 99, but it is in our airplanes today.

407
00:19:52.055 --> 00:19:54.975
Repetition and fatigue all lead to inattention,

408
00:19:55.195 --> 00:19:57.175
and there's really not much we can do about that.

409
00:19:57.665 --> 00:19:59.415
These are all the factors

410
00:19:59.565 --> 00:20:01.495
that checklists can directly address

411
00:20:05.875 --> 00:20:10.415
Any questions or comments on the history of checklists?

412
00:20:13.395 --> 00:20:14.485
Yeah, Keith, um,

413
00:20:15.875 --> 00:20:18.205
When you started off, you said this is rocket science.

414
00:20:18.645 --> 00:20:20.765
I, I meant to say it isn't rocket science.

415
00:20:21.025 --> 00:20:22.525
You said it isn't rocket science. Okay. I

416
00:20:22.525 --> 00:20:24.445
Would argue social science, which is hard,

417
00:20:25.175 --> 00:20:27.235
and that's why trying to get all this stuff implemented

418
00:20:27.235 --> 00:20:28.235
as far as your history

419
00:20:28.235 --> 00:20:31.535
and going through that actually makes it harder than rocket

420
00:20:31.535 --> 00:20:32.815
science is actually pretty straightforward.

421
00:20:33.515 --> 00:20:36.815
So Keith's comment is, uh, I mentioned

422
00:20:36.975 --> 00:20:38.135
that it's not rocket science.

423
00:20:38.845 --> 00:20:40.495
He's, and he's absolutely correct.

424
00:20:40.525 --> 00:20:42.055
This is more like social science,

425
00:20:42.055 --> 00:20:43.775
which makes it a heck of a lot harder.

426
00:20:45.385 --> 00:20:48.605
We're talking about, uh, human beings

427
00:20:48.745 --> 00:20:49.805
and getting them

428
00:20:49.905 --> 00:20:52.565
to perform well under very difficult situations.

429
00:20:53.225 --> 00:20:55.125
And, and I think that's absolutely right.

430
00:20:55.545 --> 00:20:59.525
Um, rocket science is, is more,

431
00:20:59.875 --> 00:21:01.605
more formulaic and we could, uh,

432
00:21:01.945 --> 00:21:04.245

we could get more clear results.

433
00:21:06.345 --> 00:21:08.085
Any other comments? Yes,

434
00:21:09.005 --> 00:21:10.005
I have a question. With regards

435
00:21:10.005 --> 00:21:11.245
to automation.

436
00:21:11.585 --> 00:21:13.685
You know, we're seeing a lot of, uh, modern systems

437
00:21:13.715 --> 00:21:15.125
with a high level of automation,

438
00:21:15.705 --> 00:21:18.495
which takes the human outta the loop for a period of time.

439
00:21:18.595 --> 00:21:19.735
It becomes a system monitor

440
00:21:20.425 --> 00:21:21.855
until something really bad happens

441
00:21:21.915 --> 00:21:23.655
and then it has to jump back into the loop.

442
00:21:24.555 --> 00:21:28.615
How, how are you, uh, thinking that checklist will change

443
00:21:28.755 --> 00:21:30.855
to try to cater for the ability for the human

444
00:21:30.875 --> 00:21:32.535
to jump back in the loop quickly

445
00:21:32.635 --> 00:21:34.295
and effectively where some bad things happen?

446
00:21:38.425 --> 00:21:40.075
Well, I, Is it same

447
00:21:40.095 --> 00:21:41.715
or they'll be doing something different?

448
00:21:42.555 --> 00:21:45.875
I think, I think the, the automation issues, yeah,

449
00:21:45.975 --> 00:21:49.195
as you say, especially with long range space flight

450
00:21:49.295 --> 00:21:52.195
and other factors, uh, the issue

451
00:21:52.195 --> 00:21:56.795
of keeping the pilot in the loop is, and, and,

452
00:21:56.895 --> 00:22:00.835
and long range, uh, aircraft operations is a really big one.

453
00:22:01.015 --> 00:22:05.995
Um, the checklist itself is,

454
00:22:06.175 --> 00:22:10.315
in my mind, not necessarily a tool that's going to, uh,

455
00:22:11.545 --> 00:22:14.555
address keeping a human in the loop in

456
00:22:14.595 --> 00:22:15.715
a high automation context.

457
00:22:16.815 --> 00:22:19.995
It is more of a question of once you are

458
00:22:21.065 --> 00:22:25.195
back engaged in, um, in your activities,

459
00:22:25.535 --> 00:22:26.595

are you gonna get them right?

460
00:22:27.855 --> 00:22:30.555
Um, so lemme give that some thought

461
00:22:31.175 --> 00:22:34.035
and if I come up with anything more on that

462
00:22:34.215 --> 00:22:35.915
or if we get a chance to talk during the break,

463
00:22:36.325 --> 00:22:38.475
maybe we can illuminate that a little bit further.

464
00:22:40.345 --> 00:22:41.315
Okay. Thank you.

465
00:22:45.415 --> 00:22:47.475
So, as I mentioned, I've worked with other experts

466
00:22:47.535 --> 00:22:49.835
and I'll just briefly talk about that so

467
00:22:49.835 --> 00:22:54.235
that we're not just in the silo of aviation

468
00:22:54.235 --> 00:22:57.075
and aerospace here, but thinking about the bigger world.

469
00:22:58.335 --> 00:23:01.355
And this is an area where we can really be proud of the fact

470
00:23:01.355 --> 00:23:02.915
that aviation is way ahead.

471
00:23:03.045 --> 00:23:05.035
We're actually providing leadership to a lot

472
00:23:05.035 --> 00:23:07.075
of other domains out there.

473
00:23:07.655 --> 00:23:09.475
Uh, I've worked with, uh, doctors

474
00:23:09.615 --> 00:23:13.195
and anesthesiologists in various places around the world.

475
00:23:13.775 --> 00:23:17.715
Uh, firefighters, uh, worked with the coaches of the Olympic

476
00:23:18.235 --> 00:23:21.875
athletes for the London Olympics to make sure

477
00:23:22.025 --> 00:23:25.715
that those athletes didn't forget one small piece

478
00:23:25.715 --> 00:23:28.075
of equipment that was gonna completely ruin their day.

479
00:23:28.075 --> 00:23:29.595
These were very simple checklists,

480
00:23:29.595 --> 00:23:31.475
but nevertheless, they used checklists

481
00:23:32.095 --> 00:23:35.275
and the US team did in the, uh, London Olympics to make sure

482
00:23:35.345 --> 00:23:39.475
that they didn't, uh, in, in all their, uh,

483
00:23:40.025 --> 00:23:41.275
anxiety and nervousness

484
00:23:41.275 --> 00:23:44.475
before their big day didn't leave something out,

485
00:23:44.815 --> 00:23:46.005
uh, that they needed.

486
00:23:46.945 --> 00:23:48.045

Uh, the FBI

487
00:23:48.225 --> 00:23:50.765
and some of their, um, uh,

488
00:23:51.885 --> 00:23:53.565
surveillance activities are using more

489
00:23:53.565 --> 00:23:55.125
and more sophisticated equipment

490
00:23:55.625 --> 00:23:59.525
and we're having some really serious errors in setting

491
00:23:59.525 --> 00:24:02.165
that equipment up, that we're putting agents' lives at risk,

492
00:24:02.705 --> 00:24:06.325
uh, help them develop checklists that would get them, uh,

493
00:24:06.505 --> 00:24:09.325
set up correctly every single time for their operations.

494
00:24:10.265 --> 00:24:13.365
Worked with, uh, the developers, the managers of a bio,

495
00:24:13.605 --> 00:24:15.965
a level four biohazard lab that's just an hour

496
00:24:15.965 --> 00:24:18.165
and a half north of here in Fort Dietrich, Maryland.

497
00:24:19.905 --> 00:24:22.725
Um, and they were about to open this lab,

498
00:24:22.825 --> 00:24:27.365
but really nervous about all the visiting teams of academics

499
00:24:27.705 --> 00:24:30.805
who would be coming in, working with the most

500
00:24:31.425 --> 00:24:34.405
lethal bio agents in, in the world,

501
00:24:35.145 --> 00:24:39.525
and, uh, not necessarily using the same careful steps

502
00:24:39.715 --> 00:24:40.885
that they had developed.

503
00:24:40.885 --> 00:24:43.325
So we worked on checklists to make sure that no matter

504
00:24:43.345 --> 00:24:45.085
who the team was coming in,

505
00:24:45.435 --> 00:24:48.525
they would be hitting all the critical items, uh, for safety

506
00:24:49.625 --> 00:24:51.005
and a number of other examples.

507
00:24:51.065 --> 00:24:55.405
And, and in each of these cases, we have, uh, aviation

508
00:24:55.465 --> 00:24:57.005
that's 75

509
00:24:57.065 --> 00:25:00.405
or 80 years ahead of these, some of these other domains.

510
00:25:01.005 --> 00:25:02.125
Medicine is a great example

511
00:25:02.415 --> 00:25:04.685
where they can really benefit from checklists,

512
00:25:04.905 --> 00:25:07.485
but there is still, uh, a lot of resistance

513
00:25:07.485 --> 00:25:09.165

to using checklists in medicine.

514
00:25:12.225 --> 00:25:13.245
In all of these cases,

515
00:25:13.735 --> 00:25:16.165
we're looking at the same basic situation.

516
00:25:16.425 --> 00:25:19.165
Highly trained, highly competent professionals.

517
00:25:19.475 --> 00:25:21.805
They've got the knowledge, they've got the skills,

518
00:25:21.915 --> 00:25:23.765
they have the tools and facilities,

519
00:25:24.385 --> 00:25:28.005
but there are failures to execute that lead to really, uh,

520
00:25:28.005 --> 00:25:29.925
sometimes disastrous situations.

521
00:25:32.865 --> 00:25:35.325
Any comments on other domains?

522
00:25:38.675 --> 00:25:43.005
Okay, so Bill,

523
00:25:43.185 --> 00:25:45.845
you're gonna talk about what is a checklist.

524
00:25:48.425 --> 00:25:51.325
Thanks, Dan. Checklists are not the

525
00:25:51.875 --> 00:25:53.405
overall solution to everything.

526
00:25:54.585 --> 00:25:57.525
Um, before I get into that though, I wanna refer you

527
00:25:57.525 --> 00:25:58.565
to your handouts.

528
00:25:58.565 --> 00:26:00.405
There's two different handouts that you have.

529
00:26:01.265 --> 00:26:02.805
One that is the, the longer one.

530
00:26:03.195 --> 00:26:05.685
It's not a narrative of everything we're talking about.

531
00:26:06.395 --> 00:26:07.765
It's an opportunity for you

532
00:26:07.765 --> 00:26:09.765
to capture information that is important to you.

533
00:26:10.305 --> 00:26:13.085
Now, you're going to use this more in depth when we get into

534
00:26:13.085 --> 00:26:14.965
the checklist builder, but I just want you

535
00:26:14.965 --> 00:26:16.365
to be aware of what is in there.

536
00:26:16.785 --> 00:26:19.605
In addition, in the appendix in the back of that handout,

537
00:26:19.605 --> 00:26:21.765
there are a couple things we will not refer to.

538
00:26:21.995 --> 00:26:24.245
There's a glossary of checklist terms

539
00:26:24.275 --> 00:26:25.725
that is helpful to know about.

540
00:26:25.835 --> 00:26:28.725

There's also a series of FAQs that Dan

541
00:26:28.725 --> 00:26:31.685
and I put together when we were doing this for Boeing Labs

542
00:26:32.275 --> 00:26:34.125
that you may find informational as well.

543
00:26:34.585 --> 00:26:37.445
And then the very last handout in the back of

544
00:26:37.445 --> 00:26:40.085
that book is the checklist builder itself.

545
00:26:40.535 --> 00:26:42.685
We're gonna walk through that step by step,

546
00:26:42.745 --> 00:26:45.125
but we wanted you to have all the details of that

547
00:26:45.225 --> 00:26:46.525
so you can go back and refer

548
00:26:46.525 --> 00:26:49.405
to it later when you were in the position of trying

549
00:26:49.405 --> 00:26:50.925
to develop checklists on your own.

550
00:26:51.625 --> 00:26:54.725
The other two page handout that you have is going

551
00:26:54.725 --> 00:26:56.605
to be the scenario we're going to refer

552
00:26:56.605 --> 00:26:59.965
to when we get into the exercise of how to use checklists.

553
00:27:00.265 --> 00:27:02.965
So we'll get more into detail in that in a minute.

554
00:27:04.225 --> 00:27:06.885
So the place to start when we're thinking about checklists

555
00:27:06.905 --> 00:27:08.925
is to come to an agreement on what it is.

556
00:27:08.985 --> 00:27:12.685
As I said, it's not the overall solution for everything. Dr.

557
00:27:12.955 --> 00:27:16.965
Kiis Muks at the Nassau Human Factors Lab did a study

558
00:27:17.095 --> 00:27:20.085
where they had some of their personnel ride along

559
00:27:20.315 --> 00:27:22.205
with pilots doing test flights.

560
00:27:22.865 --> 00:27:25.005
And one of the things that they found, which is one

561
00:27:25.005 --> 00:27:27.965
of the things Dan referred to earlier, the whole repetition

562
00:27:28.065 --> 00:27:30.525
and automation thing becomes a problem

563
00:27:30.995 --> 00:27:33.085
because they found the pilots,

564
00:27:33.085 --> 00:27:34.725
even though they were using the checklist,

565
00:27:35.235 --> 00:27:39.365
they were responding without actually paying attention to

566
00:27:39.365 --> 00:27:42.365
what the gauges were saying, what the switches, the position

567
00:27:42.365 --> 00:27:43.685

of the switches and so forth.

568
00:27:44.115 --> 00:27:46.165
They were responding as if

569
00:27:46.315 --> 00:27:49.525
what they should be rather than actually looking at the

570
00:27:49.525 --> 00:27:51.125
gauges and looking at the switches.

571
00:27:51.745 --> 00:27:53.045
So just

572
00:27:53.045 --> 00:27:57.005
because you're an, an advanced user of checklists, just

573
00:27:57.165 --> 00:27:58.845
because you know the advantages

574
00:27:58.845 --> 00:28:00.725
of them does not remove the problem.

575
00:28:01.705 --> 00:28:04.325
So we need to come to an agreement on what checklists are.

576
00:28:04.325 --> 00:28:08.325
And to do that, we wanna distinguish between procedures,

577
00:28:08.965 --> 00:28:13.405
training and checklist Procedures, as all of you know, is

578
00:28:14.125 --> 00:28:16.085
complete detailed documentation.

579
00:28:16.435 --> 00:28:18.405
I've put a couple of common ones up here.

580
00:28:18.845 --> 00:28:19.845
I know you can't read that.

581
00:28:20.205 --> 00:28:22.205
I wasn't intending for you to try and read it,

582
00:28:22.385 --> 00:28:24.125
but it just shows what a procedure is.

583
00:28:24.125 --> 00:28:25.765
There's a lot of information there.

584
00:28:25.835 --> 00:28:29.205
There's a lot of details, the very specific steps you need.

585
00:28:29.555 --> 00:28:32.125
It's useful as a, as a reference to go back

586
00:28:32.225 --> 00:28:34.565
and check out things, how things should be done,

587
00:28:34.985 --> 00:28:36.765
but it's not useful in real time.

588
00:28:37.265 --> 00:28:39.125
Can you imagine sitting in the cockpit

589
00:28:39.145 --> 00:28:40.285
and trying to refer

590
00:28:40.285 --> 00:28:42.645
to a document like this when you're trying to do something?

591
00:28:43.225 --> 00:28:46.165
Not gonna happen. So it's not the same as a checklist

592
00:28:47.565 --> 00:28:50.925
Training, which is my field of expertise, is something

593
00:28:50.925 --> 00:28:54.765
that we have tried to get as close to real life as possible.

594
00:28:55.305 --> 00:28:57.565

So we give you the knowledge, the understanding,

595
00:28:57.625 --> 00:28:59.285
and the skills and the opportunity

596
00:28:59.345 --> 00:29:02.965
to practice the skills in a safe environment, whether

597
00:29:02.985 --> 00:29:04.205
that's in a simulator

598
00:29:04.305 --> 00:29:07.405
or whatever the environment is to get you used to doing it.

599
00:29:07.585 --> 00:29:10.845
But it's not the same as real life when you go out there.

600
00:29:11.115 --> 00:29:13.245
Hopefully you may have some job aids

601
00:29:13.265 --> 00:29:14.365
and things to assist you,

602
00:29:14.665 --> 00:29:18.405
but it's not the same as being out in real time trying

603
00:29:18.405 --> 00:29:20.005
to do the, the skills you're learning.

604
00:29:20.545 --> 00:29:22.845
So again, it's useful as a reference.

605
00:29:23.235 --> 00:29:24.845
It's good as part of your development,

606
00:29:25.105 --> 00:29:27.045
but it's not useful on the job.

607
00:29:28.815 --> 00:29:30.125
Checklists on the other hand,

608
00:29:30.265 --> 00:29:32.245
are designed specifically for that purpose.

609
00:29:33.075 --> 00:29:35.805
They're designed to be used on the job.

610
00:29:36.785 --> 00:29:39.565
Now, the type of checklist we're talking about today,

611
00:29:40.005 --> 00:29:43.565
specifically normal, don't document everything you

612
00:29:43.585 --> 00:29:44.805
do in a procedure.

613
00:29:45.635 --> 00:29:48.445
It's an understanding that you come in with a level

614
00:29:48.445 --> 00:29:50.525
of expertise, a level of experience,

615
00:29:50.585 --> 00:29:53.085
and much of the activity you do from memory,

616
00:29:54.005 --> 00:29:55.945
the checklist is there to ensure

617
00:29:55.945 --> 00:29:59.745
that critical items are not missed to ensure the things

618
00:29:59.865 --> 00:30:00.945
that are going to impact

619
00:30:00.945 --> 00:30:03.945
with a negative outcome are addressed to be sure

620
00:30:03.945 --> 00:30:05.785
that they're addressed correctly

621
00:30:06.285 --> 00:30:08.505

and they are highly usable in real time.

622
00:30:10.835 --> 00:30:13.915
A checklist is basically a tool that ensures

623
00:30:13.915 --> 00:30:17.115
that critical actions are accomplished in enough time

624
00:30:17.115 --> 00:30:19.755
where if you miss something, you can go back and fix it.

625
00:30:20.375 --> 00:30:22.875
And it's a tool to help you do what you intend

626
00:30:22.875 --> 00:30:23.915
to do in the first place.

627
00:30:24.795 --> 00:30:26.635
A lot of the reaction against checklist

628
00:30:27.175 --> 00:30:30.555
is people think it's it's, um, a reduction

629
00:30:30.555 --> 00:30:33.275
of their expertise or it's looking down on their experience.

630
00:30:33.575 --> 00:30:36.835
It is not that at all. A checklist is simply an

631
00:30:36.875 --> 00:30:39.195
understanding and a recognition that we're all human.

632
00:30:39.655 --> 00:30:43.075
We all have the infinite ability to forget things.

633
00:30:43.595 --> 00:30:44.795
I mean, we could go around the room

634
00:30:44.795 --> 00:30:46.315
and have stories of that, of

635
00:30:46.375 --> 00:30:48.395
how we forget things on a daily basis.

636
00:30:49.185 --> 00:30:50.755
Most of the time that's not a problem.

637
00:30:51.695 --> 00:30:54.075
But when you get into critical situations,

638
00:30:54.215 --> 00:30:55.275
it can be a problem.

639
00:30:55.855 --> 00:30:57.595
And that's what a checklist has helped you

640
00:30:57.815 --> 00:30:59.155
ensure that you deal with.

641
00:30:59.855 --> 00:31:02.515
So Dan's gonna lead us through the types of checklists

642
00:31:02.515 --> 00:31:03.635
and the flows that we use.

643
00:31:05.085 --> 00:31:09.515
Thank you, bill. And these will be very familiar to you.

644
00:31:10.275 --> 00:31:14.435
A normal checklist or in a non-normal checklist is one way

645
00:31:14.435 --> 00:31:16.635
that we can divide up types of checklist.

646
00:31:17.495 --> 00:31:20.475
An example on the left here, a normal checklist.

647
00:31:20.665 --> 00:31:23.595
This is part of the Boeing series of phase

648
00:31:23.595 --> 00:31:24.715

of flight checklists.

649
00:31:24.745 --> 00:31:26.555
This happens to be on our triple seven.

650
00:31:26.965 --> 00:31:29.515
Again, it's not important that you read it, just

651
00:31:29.515 --> 00:31:32.915
that you see that it's divided up by the various phases.

652
00:31:32.925 --> 00:31:37.075
We're gonna pause and read check critical items, uh,

653
00:31:37.215 --> 00:31:38.515
for each of these phases.

654
00:31:38.975 --> 00:31:41.435
On the right is an example of a non-normal checklist.

655
00:31:41.585 --> 00:31:45.675
This one happens to be for a cargo door indication, uh,

656
00:31:45.675 --> 00:31:48.715
that the cargo door may not be locked in flight.

657
00:31:51.135 --> 00:31:55.595
And now another way of splitting up checklists is

658
00:31:55.655 --> 00:31:57.155
by the operational flow.

659
00:31:57.785 --> 00:31:59.515
This is probably also familiar to you,

660
00:31:59.535 --> 00:32:01.955
but I want to get these ideas very firm in your

661
00:32:01.955 --> 00:32:03.115
mind as we move along.

662
00:32:03.855 --> 00:32:06.515
The operational concept of a checklist can be a read

663
00:32:06.515 --> 00:32:09.955
and do flow, or can be a do then confirm.

664
00:32:10.015 --> 00:32:12.235
And you've heard these expressed in different ways,

665
00:32:12.455 --> 00:32:15.195
but this is just the way we will talk about them today.

666
00:32:15.825 --> 00:32:18.275
Read and do or do then confirm.

667
00:32:19.695 --> 00:32:21.515
So here's an example of an

668
00:32:21.515 --> 00:32:24.535
after landing flow on a, it's a,

669
00:32:24.725 --> 00:32:29.495
it's a fabricated checklist, uh, on a transport airplane.

670
00:32:30.345 --> 00:32:31.765
So after landing and

671
00:32:31.765 --> 00:32:34.565
before, uh, shutting down engines at the gate.

672
00:32:35.835 --> 00:32:37.735
On the left is a read and do checklist.

673
00:32:38.275 --> 00:32:39.565
So in this case, we're going

674
00:32:39.565 --> 00:32:43.485
to take every action from the checklist pretty much in the

675
00:32:43.725 --> 00:32:46.005

sequence that the checklist spells it out.

676
00:32:46.885 --> 00:32:48.655
Because of that, we're gonna need

677
00:32:48.655 --> 00:32:50.655
to include all the actions in the checklist.

678
00:32:51.535 --> 00:32:53.875
Uh, anything that you don't put in there could be omitted

679
00:32:53.875 --> 00:32:56.475
since you're working from the checklist as a flow

680
00:32:57.655 --> 00:33:01.435
on the right is the same procedure after landing,

681
00:33:01.655 --> 00:33:05.315
but it's philosophically it's the do then confirm checklist.

682
00:33:05.975 --> 00:33:09.955
So in this case, your, from your training, your knowledge,

683
00:33:10.615 --> 00:33:12.875
you're going to do your flow.

684
00:33:13.335 --> 00:33:15.275
You're gonna take the actions that you do,

685
00:33:15.575 --> 00:33:18.395
and you may have a little different sequence, uh,

686
00:33:18.455 --> 00:33:21.595
on a slushy day, uh, in freezing conditions.

687
00:33:21.595 --> 00:33:24.235
You may decide to leave the flaps out, uh,

688
00:33:24.315 --> 00:33:25.475
a little bit longer until you get

689
00:33:25.475 --> 00:33:26.795
to the gate or something like that.

690
00:33:27.215 --> 00:33:30.515
You may on a long taxi decide to wait to start the A PU.

691
00:33:31.175 --> 00:33:33.515
So, and the due then confirm.

692
00:33:33.615 --> 00:33:37.035
You'll take, uh, your actions from training

693
00:33:37.775 --> 00:33:39.315
in the sequence that's appropriate.

694
00:33:39.785 --> 00:33:42.195
Then before you move on to the next critical phase,

695
00:33:42.455 --> 00:33:43.955
you'll check the critical items.

696
00:33:44.455 --> 00:33:47.195
In this case, the items are considered

697
00:33:47.195 --> 00:33:49.715
to be weather radar off, which could have a safety impact

698
00:33:50.055 --> 00:33:51.435
and the a PU running

699
00:33:51.615 --> 00:33:53.995
and online, which could have an operational

700
00:33:54.445 --> 00:33:55.635
efficiency impact.

701
00:33:56.095 --> 00:33:58.315
In other words, if you lose all power at the gate,

702
00:33:58.735 --> 00:34:00.475

things get inefficient kind of quickly.

703
00:34:01.295 --> 00:34:03.915
Uh, so this is the examples of read and do

704
00:34:04.335 --> 00:34:05.755
or do then confirm.

705
00:34:06.935 --> 00:34:09.635
Here's an example of a non-normal checklist

706
00:34:10.505 --> 00:34:11.995
with a read and do flow.

707
00:34:12.455 --> 00:34:14.395
So this is the passenger evacuation.

708
00:34:15.045 --> 00:34:17.955
Again, you're going to take each action from the checklist,

709
00:34:18.385 --> 00:34:21.195
read it, and then take the action in real time.

710
00:34:25.285 --> 00:34:29.935
There's a relationship that's typical between normal,

711
00:34:30.025 --> 00:34:33.615
non-normal and do then confirm and read and do.

712
00:34:34.075 --> 00:34:36.695
So the normal checklist, the ones that cover the actions

713
00:34:36.695 --> 00:34:37.695
that you intend to do,

714
00:34:37.715 --> 00:34:40.495
or at least consider every time in a process.

715
00:34:41.665 --> 00:34:43.245
And it may not be every single time,

716
00:34:43.345 --> 00:34:44.605
but it's gonna be something

717
00:34:44.605 --> 00:34:46.565
that's commonly done in the process.

718
00:34:47.085 --> 00:34:50.335
Whatever it is that you're doing. If those are well

719
00:34:50.405 --> 00:34:51.895
practiced by the users,

720
00:34:52.775 --> 00:34:55.455
a do then confirm flow works very well.

721
00:34:55.595 --> 00:34:57.735
It gives you the operational flexibility,

722
00:34:58.755 --> 00:35:00.695
it allows the pilot to

723
00:35:01.435 --> 00:35:03.455
do their flow from memory if they're well

724
00:35:03.455 --> 00:35:04.935
practiced, uh, in it.

725
00:35:05.275 --> 00:35:08.295
And then it confirms just those critical actions

726
00:35:08.645 --> 00:35:09.975
that are safety related.

727
00:35:11.195 --> 00:35:14.655
Now, if it was an infrequent process, you may need

728
00:35:14.655 --> 00:35:15.855
to use a read and do checklist

729
00:35:15.855 --> 00:35:19.055

because the users would not be familiar enough, uh,

730
00:35:19.275 --> 00:35:21.175
to do the flow every time correctly.

731
00:35:22.515 --> 00:35:25.175
On the non-normal side, the non-normal, so the,

732
00:35:25.175 --> 00:35:27.295
those checklists that cover contingency actions

733
00:35:27.295 --> 00:35:29.015
that may be needed occasionally,

734
00:35:29.115 --> 00:35:31.375
and they may be even extremely rare.

735
00:35:31.915 --> 00:35:33.935
Of course, there are a lot of non-normal checklists

736
00:35:33.935 --> 00:35:35.655
that are in our books that we'll never actually

737
00:35:35.715 --> 00:35:37.605
do in operation.

738
00:35:39.945 --> 00:35:43.325
So most of the time those are going to be read

739
00:35:43.325 --> 00:35:44.485
and do type checklists.

740
00:35:44.735 --> 00:35:46.285
We're going to take the actions

741
00:35:46.805 --> 00:35:48.885
directly from the checklist in real time.

742
00:35:50.275 --> 00:35:52.215
If there are urgent actions, that's

743
00:35:52.215 --> 00:35:53.335
where memory items come in.

744
00:35:53.795 --> 00:35:57.065
So there you would need to accomplish those.

745
00:35:57.165 --> 00:35:58.545
You wouldn't have time necessarily

746
00:35:58.645 --> 00:35:59.865
to refer to your checklist.

747
00:36:00.445 --> 00:36:01.465
So you'd have memory items.

748
00:36:01.565 --> 00:36:03.465
And of course, with memory items comes

749
00:36:03.665 --> 00:36:04.705
a training requirement.

750
00:36:05.005 --> 00:36:07.785
That's why we're in there in the simulator every six months

751
00:36:07.805 --> 00:36:09.345
or annually and running

752
00:36:09.345 --> 00:36:11.385
through those memory items every time.

753
00:36:13.045 --> 00:36:16.855
Okay, so these are gonna be our typical associations

754
00:36:16.855 --> 00:36:20.015
between the normal, non-normal and then the types of flows.

755
00:36:21.135 --> 00:36:23.155
Any questions or comments on that?

756
00:36:26.055 --> 00:36:29.465

Okay, those are familiar, familiar topics.

757
00:36:30.245 --> 00:36:33.345
So we'll get started now, uh, with the checklist builder.

758
00:36:33.575 --> 00:36:37.185
This is our exercise in, in creating, uh,

759
00:36:37.765 --> 00:36:39.025
in creating checklists.

760
00:36:39.025 --> 00:36:40.825
And I'll let Bill get started with you.

761
00:36:43.125 --> 00:36:45.305
So to be sure we accomplish all the things we've been

762
00:36:45.305 --> 00:36:48.265
talking about, to be sure we answer all the right questions,

763
00:36:48.765 --> 00:36:51.345
we need to have a guide to help us do that.

764
00:36:51.445 --> 00:36:53.185
And the checklist builder is that guide.

765
00:36:53.805 --> 00:36:57.185
The checklist builder helps us to look at the questions

766
00:36:57.185 --> 00:37:00.825
that need to be answered and the con considerations

767
00:37:00.825 --> 00:37:02.225
that need to be thought through.

768
00:37:02.365 --> 00:37:05.745
In designing a checklist, it helps to decide if we're going

769
00:37:05.745 --> 00:37:08.225
to do a read and do or do then confirm.

770
00:37:08.495 --> 00:37:10.905
When I was working with the ordinance lab in Huntington

771
00:37:10.905 --> 00:37:13.905
Beach, one of the things that they do, every checklist

772
00:37:14.015 --> 00:37:16.185
that they have is a read and do checklist,

773
00:37:16.185 --> 00:37:20.425
because every step in their sequence is a critical step.

774
00:37:21.245 --> 00:37:24.345
One error can result in a cataclysmic result,

775
00:37:24.345 --> 00:37:25.585
which they don't want to have happen.

776
00:37:25.965 --> 00:37:27.705
So everything they do is a read and do,

777
00:37:27.705 --> 00:37:28.985
but you have to make that decision.

778
00:37:29.725 --> 00:37:32.665
The checklist builder is a step-by-step guide

779
00:37:32.725 --> 00:37:34.665
to building effective checklists.

780
00:37:35.045 --> 00:37:37.025
And one of the problems is a lot

781
00:37:37.025 --> 00:37:39.585
of checklists are designed without having this kind

782
00:37:39.585 --> 00:37:42.505
of a guide, and then people don't want to use it,

783
00:37:42.515 --> 00:37:43.985

which we'll talk about in just a minute.

784
00:37:44.365 --> 00:37:46.745
The focus of what we're doing is on normal checklist

785
00:37:47.325 --> 00:37:50.265
to give a a simple op opportunity

786
00:37:50.765 --> 00:37:54.225
to learn the process without getting mired down in the,

787
00:37:54.965 --> 00:37:58.385
in the the exercise scenario,

788
00:37:58.835 --> 00:38:00.865
there are six steps in the checklist builder.

789
00:38:00.955 --> 00:38:02.425
We're going to look at all six steps,

790
00:38:02.885 --> 00:38:07.305
the operational concept, the critical items, pause points

791
00:38:07.405 --> 00:38:11.585
as far as when you pause to use the checklist, reduce

792
00:38:11.605 --> 00:38:15.425
and phrase how to word it appropriately, how to format it,

793
00:38:15.425 --> 00:38:19.945
and then how to test and improve, and the place to start.

794
00:38:20.845 --> 00:38:23.145
Dan worked with Dr. Gwane when Dr.

795
00:38:23.275 --> 00:38:26.225
Gwane was writing his book, the Checklist Manifesto.

796
00:38:27.045 --> 00:38:30.225
And I would encourage you, if you have not read that book,

797
00:38:30.255 --> 00:38:32.625
it's a great book, a great motivation.

798
00:38:33.045 --> 00:38:36.045
Dr. Gwane shares his own experience in the medical field,

799
00:38:36.185 --> 00:38:39.885
as well as many other fields in construction and finance

800
00:38:40.105 --> 00:38:41.725
and many others that are using checklist.

801
00:38:42.585 --> 00:38:44.925
But Dana had the opportunity to collaborate with him

802
00:38:45.545 --> 00:38:48.525
in working on the book and in aerospace

803
00:38:48.785 --> 00:38:50.245
and in the place to start.

804
00:38:50.425 --> 00:38:52.285
And what came out of that was the,

805
00:38:52.285 --> 00:38:54.725
was the checklist builder, which we're going to use today.

806
00:38:55.275 --> 00:38:59.925
It's a public domain information, so it's not protected

807
00:38:59.925 --> 00:39:01.685
by copyright or anything else.

808
00:39:01.875 --> 00:39:02.925
It's out there for use.

809
00:39:04.905 --> 00:39:09.405
The scenario that you have, which is one of those

810
00:39:10.505 --> 00:39:13.285

sheets that are, that you have in front of you,

811
00:39:14.705 --> 00:39:16.805
is gonna provide the procedural steps

812
00:39:16.955 --> 00:39:19.245
that you're gonna follow, background

813
00:39:19.245 --> 00:39:20.525
or research on each step

814
00:39:21.145 --> 00:39:24.165
and the assumptions about the operational context.

815
00:39:24.825 --> 00:39:26.445
And then you and your groups are going

816
00:39:26.445 --> 00:39:30.125
to develop the checklist based on what you see

817
00:39:30.825 --> 00:39:32.325
in all of this information.

818
00:39:33.105 --> 00:39:35.325
Now, one of the things that we need to explain,

819
00:39:35.635 --> 00:39:36.685
there's no right

820
00:39:36.745 --> 00:39:39.645
and wrong in terms of the result of your checklist.

821
00:39:40.275 --> 00:39:42.205
It's what is effective for your group,

822
00:39:42.745 --> 00:39:44.405
how it is designed for your group.

823
00:39:44.745 --> 00:39:47.285
The way you title it may be different from the way another

824
00:39:47.285 --> 00:39:49.165
group titles it, but if it's working

825
00:39:49.305 --> 00:39:50.925
for you, then it's good.

826
00:39:51.105 --> 00:39:53.125
If it's not, then you need to reconsider.

827
00:39:53.425 --> 00:39:55.485
So there's no right and wrong necessarily.

828
00:39:57.425 --> 00:40:00.565
As we discussed the checklist builder, Dan's gonna walk you

829
00:40:00.565 --> 00:40:02.445
through it and you're going to apply that

830
00:40:02.445 --> 00:40:03.605
to the workshop scenario.

831
00:40:03.855 --> 00:40:07.205
Again, it's a simple scenario with very few steps,

832
00:40:07.345 --> 00:40:09.645
so you can get the feel for the checklist builder

833
00:40:09.825 --> 00:40:11.645
and not the scenario itself.

834
00:40:12.225 --> 00:40:15.365
The hope from that is you'll come out with a feeling of how

835
00:40:15.365 --> 00:40:18.045
to apply those principles and concepts

836
00:40:18.045 --> 00:40:21.205
and steps to larger teams when you've got more teams

837
00:40:21.305 --> 00:40:22.805

and more people working on a checklist.

838
00:40:23.315 --> 00:40:26.645
When you've got multiple phases in a checklist that need

839
00:40:26.645 --> 00:40:29.485
to be addressed, as well as when you've got a procedure

840
00:40:29.485 --> 00:40:31.165
that may be several pages long,

841
00:40:31.505 --> 00:40:33.965
and how do you boil that down to the critical items

842
00:40:33.965 --> 00:40:36.565
that need to be addressed in your checklist

843
00:40:36.675 --> 00:40:37.685
that you're developing.

844
00:40:39.225 --> 00:40:40.365
So let's take a look at,

845
00:40:40.505 --> 00:40:42.165
and again, you have this in your handout.

846
00:40:42.825 --> 00:40:45.445
The scenario itself, I'm just gonna read this,

847
00:40:45.465 --> 00:40:46.485
so we're all together.

848
00:40:47.265 --> 00:40:50.485
In your flight test operation, it's common to land

849
00:40:51.075 --> 00:40:52.245
taxi clear of the runway

850
00:40:52.385 --> 00:40:55.045
and depart again, without shutting down engines.

851
00:40:55.905 --> 00:40:58.925
Flight crews know the procedure, but errors

852
00:40:58.925 --> 00:41:01.285
and omissions have occurred due to interruptions,

853
00:41:01.885 --> 00:41:03.445
distractions, and other factors.

854
00:41:05.225 --> 00:41:10.005
The assumptions, the two flight crew may be two company test

855
00:41:10.105 --> 00:41:14.085
pilots or maybe one company pilot monitoring

856
00:41:14.265 --> 00:41:16.525
and one cu customer pilot flying.

857
00:41:17.665 --> 00:41:19.765
The company crew members are well

858
00:41:19.765 --> 00:41:20.965
practiced in the procedure.

859
00:41:22.025 --> 00:41:26.165
The airplane may be taxing with possible a TC pressure due

860
00:41:26.165 --> 00:41:27.445
to other taxing traffic,

861
00:41:28.305 --> 00:41:31.405
or the airplane may be parked with no time pressure.

862
00:41:32.275 --> 00:41:34.925
The before takeoff checklist will be accomplished

863
00:41:34.985 --> 00:41:38.165
as a final action before entering the runway for takeoff.

864
00:41:38.585 --> 00:41:39.845

As I mentioned the before,

865
00:41:39.845 --> 00:41:42.325
takeoff checklist is included on the third page,

866
00:41:42.705 --> 00:41:44.565
and there are other details of the procedure

867
00:41:44.625 --> 00:41:46.365
and considerations on the second page.

868
00:41:48.945 --> 00:41:51.605
So the place we're going to start in doing this is

869
00:41:51.625 --> 00:41:52.725
the operational concept.

870
00:41:53.925 --> 00:41:56.645
I have yet to work with any team

871
00:41:57.145 --> 00:41:59.085
and a number of teams have come to me

872
00:41:59.085 --> 00:42:01.485
and asked me to review the checklist they're developing.

873
00:42:02.245 --> 00:42:05.685
I have never had an initial submission of a checklist

874
00:42:05.825 --> 00:42:08.965
for review that dealt with the operational concept,

875
00:42:09.625 --> 00:42:11.125
and that creates some problems.

876
00:42:11.825 --> 00:42:14.245
In fact, it's the most important step,

877
00:42:14.345 --> 00:42:15.765
and yet it's often skipped.

878
00:42:15.905 --> 00:42:17.765
Dr. Gde experienced this himself.

879
00:42:18.625 --> 00:42:20.925
He was working with the World Health Organization

880
00:42:20.985 --> 00:42:23.085
to develop a surgical safety checklist,

881
00:42:23.865 --> 00:42:27.125
and he wanted to test it with his team and his hospital

882
00:42:27.185 --> 00:42:30.325
and so forth to work out any bugs before they rolled it out.

883
00:42:31.635 --> 00:42:35.715
Well, the problem was it wasn't working. People hated it.

884
00:42:36.025 --> 00:42:38.675
They didn't want to use it, they didn't feel it added value.

885
00:42:39.255 --> 00:42:40.435
And so he didn't know what to do,

886
00:42:40.435 --> 00:42:41.635
he didn't know what the problem was.

887
00:42:42.055 --> 00:42:43.755
So he called on Dan to come in

888
00:42:43.755 --> 00:42:45.995
and work with them to see if they could identify

889
00:42:46.185 --> 00:42:48.595
what the problem was in trying

890
00:42:48.655 --> 00:42:50.675
to implement this particular checklist.

891
00:42:51.575 --> 00:42:54.555

And what Dan found was they had not worked through, this was

892
00:42:54.555 --> 00:42:56.595
before the checklist builder was developed.

893
00:42:57.215 --> 00:42:58.915
He found that they had not worked

894
00:42:58.915 --> 00:43:00.355
through the operational concept.

895
00:43:00.895 --> 00:43:02.195
And here's a few of the questions.

896
00:43:02.255 --> 00:43:05.955
The operational concept answers, there's nine altogether.

897
00:43:06.855 --> 00:43:09.555
But without addressing these, you've got confusion,

898
00:43:09.555 --> 00:43:11.635
you've got chaos, you've got ambiguity

899
00:43:11.985 --> 00:43:13.795
that doesn't make for a good checklist.

900
00:43:14.455 --> 00:43:16.075
One of the things that Dan was sharing

901
00:43:16.105 --> 00:43:17.915
that they encountered Dr.

902
00:43:18.165 --> 00:43:19.875
Gwane, one of the questions was, who will call

903
00:43:19.875 --> 00:43:21.115
and read the steps in the checklist?

904
00:43:21.895 --> 00:43:24.955
Dr. Gwane had decided he was going to read the checklist,

905
00:43:25.815 --> 00:43:28.195
but the problem was he was already scrubbed in,

906
00:43:28.335 --> 00:43:29.755
and so he couldn't pick it up

907
00:43:29.755 --> 00:43:32.275
and read it, so somebody else had to pick it up

908
00:43:32.275 --> 00:43:34.155
and hold it out for him to read.

909
00:43:34.885 --> 00:43:37.275
Again, that causes a little bit of chaos, a little bit

910
00:43:37.275 --> 00:43:38.395
of confusion, a little bit

911
00:43:38.395 --> 00:43:40.395
of not sure quite what's going on,

912
00:43:40.415 --> 00:43:42.035
and there were a lot of other things happening.

913
00:43:43.095 --> 00:43:45.715
So we're gonna work through the operational concept

914
00:43:45.895 --> 00:43:48.235
and all the other steps in order to get this right.

915
00:43:49.415 --> 00:43:51.235
Dan, you wanna share a little bit about the fire

916
00:43:51.235 --> 00:43:52.235
Department? Sure.

917
00:43:52.235 --> 00:43:55.475
I, I, uh, had the, uh,

918
00:43:55.545 --> 00:43:58.875

fire battalion chief from the Atlantic City,

919
00:43:58.975 --> 00:44:02.075
New Jersey Fire Department contact me a few years ago.

920
00:44:02.775 --> 00:44:06.155
He had been working on a checklist for quite some time

921
00:44:06.255 --> 00:44:10.835
and had it just about finished, he thought, um, for

922
00:44:11.495 --> 00:44:15.035
the fire, fire engine response outta the firehouse and then

923
00:44:15.455 --> 00:44:19.595
before returning, after dealing with the fire emergency.

924
00:44:19.695 --> 00:44:23.635
And then, uh, upon arriving back at the fire station,

925
00:44:23.735 --> 00:44:24.955
had a multi-phase checklist

926
00:44:26.695 --> 00:44:29.955
and there were a number of issues, uh,

927
00:44:29.955 --> 00:44:32.045
that were easily recognizable.

928
00:44:32.045 --> 00:44:34.165
And so I'll show you what it, what can happen

929
00:44:34.165 --> 00:44:36.645
with a checklist before an operational concept

930
00:44:36.825 --> 00:44:39.485
or without an operational concept having been developed.

931
00:44:39.985 --> 00:44:41.045
So some of these items,

932
00:44:41.145 --> 00:44:42.405
and I'm not sure you,

933
00:44:42.515 --> 00:44:44.405
I'll read them out in case you can't see them,

934
00:44:44.825 --> 00:44:47.525
but, uh, all members are in proper, uh,

935
00:44:48.255 --> 00:44:51.325
protection equipment seated with seat belts secured.

936
00:44:51.325 --> 00:44:53.885
And then there's a yes, there's a yes on all of these.

937
00:44:54.785 --> 00:44:56.565
Um, overhead door fully opened

938
00:44:56.585 --> 00:44:58.485
and stopped, no personnel,

939
00:44:58.485 --> 00:45:01.005
electronic personal electronic devices are in use.

940
00:45:01.535 --> 00:45:04.005
These all work as confirm items.

941
00:45:04.785 --> 00:45:08.365
So at the moment that you're ready to run the, the, uh,

942
00:45:08.365 --> 00:45:12.045
equipment out the door, these could be a, a confirm items,

943
00:45:13.105 --> 00:45:16.005
but this last item, officer signals driver

944
00:45:16.105 --> 00:45:17.405
to disengage air brake

945
00:45:17.465 --> 00:45:20.925

and begin response is phrased as a read and do item.

946
00:45:22.065 --> 00:45:25.325
So there's a little bit of a change in the operational

947
00:45:25.325 --> 00:45:26.805
concept right in that checklist.

948
00:45:27.505 --> 00:45:30.885
And then in the en route portion there are items such as

949
00:45:31.525 --> 00:45:32.885
response speed is appropriate,

950
00:45:33.465 --> 00:45:36.245
and then it says, no, adjust speed appropriately.

951
00:45:37.365 --> 00:45:41.135
Intersections approached with caution, no use caution

952
00:45:42.675 --> 00:45:44.055
change in siren tone.

953
00:45:44.865 --> 00:45:48.855
These are very much real time activities.

954
00:45:49.155 --> 00:45:50.895
In fact, I wouldn't even say they work

955
00:45:50.895 --> 00:45:51.935
in a checklist at all.

956
00:45:52.045 --> 00:45:53.215
They're more like training.

957
00:45:54.035 --> 00:45:58.995
So we had a combination of, uh, do then confirm,

958
00:45:59.825 --> 00:46:02.675
read and do training information.

959
00:46:03.615 --> 00:46:06.315
And when people saw this checklist,

960
00:46:06.825 --> 00:46:08.515
they may look at it on a piece of paper

961
00:46:08.515 --> 00:46:09.755
and say, oh, this looks pretty good.

962
00:46:09.755 --> 00:46:10.795
These are important items.

963
00:46:11.135 --> 00:46:14.115
But when they try to use it in real time, it's not usable.

964
00:46:14.415 --> 00:46:18.075
And we'll show you later on, uh, what resulted after he

965
00:46:18.075 --> 00:46:19.115
and I worked together and went

966
00:46:19.115 --> 00:46:20.555
through the checklist builder process.

967
00:46:24.175 --> 00:46:26.555
So the first step, uh, in the op

968
00:46:26.555 --> 00:46:28.115
and there it's basically a checklist

969
00:46:28.495 --> 00:46:31.995
or a, uh, a survey to get through the operational concept.

970
00:46:32.575 --> 00:46:36.155
And it has these nine steps, nine things to consider.

971
00:46:36.575 --> 00:46:38.315
And then what works really well is

972
00:46:38.315 --> 00:46:41.315

to write out the operational concept as a statement.

973
00:46:42.015 --> 00:46:43.475
Uh, so I'm gonna read one to you.

974
00:46:43.505 --> 00:46:46.115
It's not the example we're doing today in the exercise.

975
00:46:46.145 --> 00:46:49.155
It's a different one. Operational concept statement

976
00:46:49.175 --> 00:46:51.115
for production flight preparation checklist.

977
00:46:51.255 --> 00:46:53.955
So this will be getting ready for a production flight.

978
00:46:55.075 --> 00:46:57.375
The production flight preparation checklist will cover the

979
00:46:57.375 --> 00:47:00.055
process that begins with a crew assigned on the day

980
00:47:00.055 --> 00:47:02.375
of the flight and ends at the conclusion

981
00:47:02.515 --> 00:47:03.615
of the pre-flight meeting.

982
00:47:04.315 --> 00:47:05.655
So there's the beginning and the end.

983
00:47:06.005 --> 00:47:07.775
This is a well practice process.

984
00:47:08.445 --> 00:47:09.655
This is a normal checklist

985
00:47:09.885 --> 00:47:12.975
that will be used in a do then confirm flow.

986
00:47:13.485 --> 00:47:16.015
Exception will be a section for a crew briefing,

987
00:47:16.185 --> 00:47:17.895
which will be read and do.

988
00:47:18.515 --> 00:47:20.975
The checklist will be printed on a laminated card.

989
00:47:21.595 --> 00:47:22.975
The checklist will be called for

990
00:47:22.975 --> 00:47:26.175
and read by the pilot in command responses will be

991
00:47:26.175 --> 00:47:27.775
by area of responsibility.

992
00:47:28.395 --> 00:47:30.685
The checklist will have check boxes that are marked,

993
00:47:31.075 --> 00:47:33.125
then erased, and the checklist reused.

994
00:47:34.065 --> 00:47:35.325
So there is an op.

995
00:47:35.545 --> 00:47:38.525
Now you know how you intend to use this checklist,

996
00:47:38.745 --> 00:47:41.805
and it gives you the information you need to actually go

997
00:47:41.805 --> 00:47:42.965
through and design the checklist

998
00:47:43.345 --> 00:47:45.685
for the context it will be used in.

999
00:47:45.825 --> 00:47:48.165

That's what the operational concept will look like.

1000
00:47:48.585 --> 00:47:50.165
So we'll just run through the steps.

1001
00:47:50.795 --> 00:47:52.765
I'll show you a few of them at a time,

1002
00:47:52.905 --> 00:47:54.725
and then you'll break into your groups

1003
00:47:55.305 --> 00:47:57.725
and answer each of these survey questions.

1004
00:47:58.705 --> 00:48:00.445
The first couple of them that we will look at,

1005
00:48:00.465 --> 00:48:01.805
the first is the checklist title.

1006
00:48:03.105 --> 00:48:07.605
So typically the checklist title will, will

1007
00:48:08.365 --> 00:48:09.845
represent the name of the procedure.

1008
00:48:10.665 --> 00:48:14.165
The thing about it is that we wanna make it brief and clear.

1009
00:48:15.025 --> 00:48:16.645
Uh, it really just needs

1010
00:48:16.665 --> 00:48:19.645
to distinguish this checklist from other checklists.

1011
00:48:19.645 --> 00:48:21.365
Make it recognizable. It doesn't need

1012
00:48:21.365 --> 00:48:23.085
to be a full description

1013
00:48:23.155 --> 00:48:25.645
because we actually want the person doing the

1014
00:48:25.645 --> 00:48:26.765
checklist to read the title.

1015
00:48:26.765 --> 00:48:28.045
That's the first thing we do, right?

1016
00:48:28.045 --> 00:48:31.685
When we pick up a non-normal checklist is announce the title

1017
00:48:31.705 --> 00:48:33.325
of the checklist that we're about to read.

1018
00:48:33.945 --> 00:48:35.845
So we want to keep it very concise,

1019
00:48:36.065 --> 00:48:37.765
the minimum number of words.

1020
00:48:39.265 --> 00:48:40.325
The next thing we want

1021
00:48:40.325 --> 00:48:43.005
to define is the procedure beginning and end.

1022
00:48:43.375 --> 00:48:45.565
You'd be surprised at the amount of confusion

1023
00:48:45.565 --> 00:48:48.485
that happens when I am with people developing checklist

1024
00:48:48.485 --> 00:48:51.565
because not everyone in the room actually agrees on

1025
00:48:51.715 --> 00:48:53.605
what the scope is of the procedure

1026
00:48:53.605 --> 00:48:55.165

that we're doing the checklist on.

1027
00:48:55.945 --> 00:48:58.805
Uh, so just a brief statement of agreement

1028
00:48:58.875 --> 00:49:00.885
that this is the beginning of the flow.

1029
00:49:01.195 --> 00:49:02.725
This is the end of the flow

1030
00:49:02.915 --> 00:49:04.925
that this checklist is going to be covering.

1031
00:49:06.225 --> 00:49:09.805
So let's, uh, this is, these are pretty easy steps.

1032
00:49:09.965 --> 00:49:13.725
I think in about five minutes, you ought to be able to, uh,

1033
00:49:14.425 --> 00:49:19.085
be in your groups and consider for the operational scenario

1034
00:49:19.085 --> 00:49:21.445
that you have here, I'll give you a little longer

1035
00:49:21.445 --> 00:49:23.085
because you're, this is your first look at

1036
00:49:23.085 --> 00:49:24.165
the operational scenario.

1037
00:49:24.345 --> 00:49:28.965
So let's take, I don't know. Okay.

1038
00:49:29.355 --> 00:49:31.685
Yeah. And, uh, let's take about six minutes.

1039
00:49:31.775 --> 00:49:33.805
We'll shoot for that and make, we'll see if we're done.

1040
00:49:33.835 --> 00:49:37.685
Then I, um, and,

1041
00:49:37.745 --> 00:49:38.765
but do tell me, uh,

1042
00:49:38.845 --> 00:49:40.965
now if you have any questions about this, uh,

1043
00:49:42.865 --> 00:49:45.965
on the checklist title or the procedure beginning and end.

1044
00:49:48.865 --> 00:49:51.605
Any questions? Okay.

1045
00:49:51.905 --> 00:49:53.485
So have a look at your scenarios

1046
00:49:54.265 --> 00:49:58.525
and somebody in the group, uh, take a time hack

1047
00:49:58.745 --> 00:50:01.485
and we'll look at about six minutes from now

1048
00:50:02.345 --> 00:50:04.045
and come up with a checklist title

1049
00:50:04.665 --> 00:50:07.285
and a statement of when the procedure begins and ends.

1050
00:50:08.035 --> 00:50:09.605
Okay, bill, and I'll be available.

1051
00:50:11.075 --> 00:50:14.405
This Is group work, this group in before.

1052
00:50:14.665 --> 00:50:16.085
Get back around to work this.

1053
00:50:21.515 --> 00:50:23.685

Yeah. So yeah. Form into the same groups

1054
00:50:23.715 --> 00:50:24.725
that you were in before.

1055
00:50:27.475 --> 00:50:29.205
Okay. If I could have your attention up here,

1056
00:50:32.185 --> 00:50:34.765
we wanna get some feedback on what you came up with.

1057
00:50:43.065 --> 00:50:46.245
So a couple people, one at a time.

1058
00:50:46.355 --> 00:50:48.525
Someone shout out your title for me.

1059
00:50:49.995 --> 00:50:51.245
Full stop. Taxi back.

1060
00:50:52.395 --> 00:50:55.445
Okay. Hold on. Full stop.

1061
00:50:58.235 --> 00:51:02.965
Taxi back. Okay. And the next one, quick turn. Quick turn.

1062
00:51:07.635 --> 00:51:08.405
Okay, one more

1063
00:51:08.765 --> 00:51:09.765
Regeneration.

1064
00:51:10.015 --> 00:51:12.605
Sorry. Regeneration. Regeneration.

1065
00:51:14.465 --> 00:51:15.925
Wow, that sounds pretty promising.

1066
00:51:21.975 --> 00:51:26.925
We're all gonna line up for that one. Okay.

1067
00:51:28.625 --> 00:51:31.605
So as you could see, very different titles

1068
00:51:31.665 --> 00:51:33.165
for exactly the same process.

1069
00:51:34.305 --> 00:51:38.245
So while the title is important, it's really up to you

1070
00:51:38.305 --> 00:51:40.205
to determine what is the most effective

1071
00:51:40.205 --> 00:51:41.365
title for your group.

1072
00:51:42.755 --> 00:51:45.485
Okay. How about then,

1073
00:51:47.345 --> 00:51:49.085
But I'm gonna mention, by the way, uh,

1074
00:51:49.535 --> 00:51:52.205
we're gonna take a break just after this report out.

1075
00:51:52.265 --> 00:51:54.805
So, uh, uh, just to let you know,

1076
00:51:57.395 --> 00:51:58.395
Okay. Beginning and

1077
00:51:58.395 --> 00:52:01.805
end. That's the beginning.

1078
00:52:01.915 --> 00:52:02.525
Beginning

1079
00:52:06.455 --> 00:52:07.325
after landing.

1080
00:52:09.825 --> 00:52:12.965

And the end. Before take, before take off.

1081
00:52:19.675 --> 00:52:20.645
Okay. Someone else

1082
00:52:21.435 --> 00:52:22.445
Upon clearing the runway,

1083
00:52:23.825 --> 00:52:25.165
I'm sorry, I couldn't hear you upon

1084
00:52:25.165 --> 00:52:27.165
Clearing the runway Upon.

1085
00:52:36.675 --> 00:52:38.525
Okay. And the end,

1086
00:52:39.475 --> 00:52:40.475
Unleash Them all. Checklist

1087
00:52:40.475 --> 00:52:41.405
items.

1088
00:52:52.995 --> 00:52:55.165
Okay. One more. Full Stop.

1089
00:52:56.435 --> 00:52:57.885
Full stop. Yes.

1090
00:52:59.945 --> 00:53:02.405
We assume this could be a stop and go.

1091
00:53:02.625 --> 00:53:06.165
So, okay. Good. Very good point. Yep.

1092
00:53:06.545 --> 00:53:08.805
And what's the end before Takeoff?

1093
00:53:09.055 --> 00:53:12.045
Sorry? Before takeoff. Before takeoff. Okay.

1094
00:53:13.035 --> 00:53:15.885
Yeah, that was a good point. Could be a stop and go.

1095
00:53:16.105 --> 00:53:18.845
It could be a taxi back on the runway.

1096
00:53:19.065 --> 00:53:21.005
It could be clearing the runway. Good point.

1097
00:53:22.515 --> 00:53:24.645
Okay. Again, some of these assumptions are,

1098
00:53:24.665 --> 00:53:26.045
are the ones you need to think through,

1099
00:53:26.235 --> 00:53:28.205
they thought in one perspective.

1100
00:53:28.355 --> 00:53:29.405
Some of you may have thought

1101
00:53:29.405 --> 00:53:30.485
of it in a different perspective.

1102
00:53:30.585 --> 00:53:32.685
So it depends on where you're coming from as far as

1103
00:53:32.685 --> 00:53:34.685
what you're going to include in the beginning and the end.

1104
00:53:35.675 --> 00:53:38.405
Okay. Now you may have come up with something different.

1105
00:53:38.405 --> 00:53:41.045
That's okay. You're gonna continue to work this

1106
00:53:41.045 --> 00:53:43.605
through the rest of the steps in the checklist builder

1107
00:53:43.625 --> 00:53:44.845

and the operational concept.

1108
00:53:45.425 --> 00:53:46.725
So just keep in mind

1109
00:53:46.725 --> 00:53:48.765
because it's a sequential kind of a thing.

1110
00:53:49.755 --> 00:53:53.045
Okay? We're gonna take a break at this point and 15 minutes.

1111
00:53:53.225 --> 00:53:55.845
So look at your watch. Figure 15 minutes,

1112
00:53:55.985 --> 00:53:57.565
be back in here, ready to go at that time.

1113
00:53:58.335 --> 00:53:58.965
Thank you all.