Analysis of Demining of Asphalt-Concrete Surfaces of the Airport of Zadar - lessons learned, 25 years later

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2005  MoD - Director of Defence Institute for Research and Development
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1992  Senior Adviser in the Production Department
1991  Croatian Armed Forces
1986  Maritime Institute, City of Zagreb
1985  Naval Base, City of Pula
Zadar Airport – today
Civilian airport was occupied by enemy army from the 17\textsuperscript{th} of September 1991. to 25\textsuperscript{th} of January 1993.
Brigadier Ivan Vitanović states:

„I knew that the runway was mined and I was the first person to find this out in 1992. The area of the civil airport was full of challenges and I was never sure where a trap and surprise were awaiting”

According to our discoveries, there were 20 holes with explosive placed under the runway to blow it up, in every hole there was around 160-200 kg of explosive.

We concluded that the civil and military runway in Zadar was mined in the same way as the one in Pula. “PU+2xZD” was painted on the civil runway by base paint.”
Death of pyrotechnicians at the Pula airport
In Memoriam, 25 years after death
UN officers
Captain Jean Pierre Linares
Lieutenant Filipe Capo
They died in July, 1992
Alen Bruketa
Croatian Army
Died in 1993.
Regatta
„In Memoriam Alen Bruket

Death of pyrotechnician at the Zadar airport
What was hiding under the runway in 1993?
Crucial information

AIRPORT PULA

AIRPORT ZADAR
Runway 2000 m long and 45 m wide.
Appearance of the hole

TNT Explosive (in long tube)
Appearance of the hole

TNT Explosive (in long tube)

Fuses position
Presentation to Air Force Commander
In Memoriam
General Colonel
Imara Agotić
Air Force Commander
Presumption

Presentation to Air Force Commander

Fuses position

Runway

Work position
Idea of demining the hole

POSITION OF FUSES
Concept of demining

1. removing vegetation from green surfaces, 7 m from the edge of the runway,
2. clearing an approach to the hole entries,
3. soil excavation in order to approach the plastic tubes with explosive charges,
4. drilling, fixing and sawing the pipes and explosive charges,
5. inserting so called “Sandwich” to prevent transfer of detonation,
6. destroying front (cut part) part of the pipe,
7. pulling out the explosive charge from the rest part of the pipe.
Demining
Demining

Hole (tube) with approximately 250kg of TNT explosive
Demining

Runway

Runway
Demining

Runway → Destroying front → “Sandwich” → Runway
Demining

Runway
Demining

Runway

“Sandwich”
Mine Fuses

Eye of light fuse

Battery 9V

Time fuse
Mine Fuses

wire - the connection between the front and rear fuse

4 kg = 8.8 pound TNT explosive

Time fuse
Bomb trap

Time fuse
Tube
Mechanical fuse
Rear fuse

Front fuse
Fuse, plastic explosive and TNT bullet

Light fuse

Time fuse
Time fuse

Mechanical fuse
The time fuse was a „sham“ or "trap". The active position didn't released !!!!!!! Why?

0900 (minutes)
15 hours
There was a second fuse!
Explosive type TNT – into runway

<table>
<thead>
<tr>
<th>OBJECT</th>
<th>Holes from 1-20</th>
<th>HOLE MARK</th>
<th>Length (m)</th>
<th>Amount (kg)</th>
<th>Total amount (kg)</th>
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<td>8</td>
<td>1,2,5,7,10,12,15 and 18</td>
<td>27.2</td>
<td>224</td>
<td>1.792</td>
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<tr>
<td>3</td>
<td>3,8 and 13</td>
<td>26.7</td>
<td>216</td>
<td>648</td>
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</tr>
<tr>
<td>1</td>
<td>17</td>
<td>26.2</td>
<td>212</td>
<td>212</td>
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<tr>
<td>3</td>
<td>14,16 and 19</td>
<td>25.5</td>
<td>208</td>
<td>624</td>
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<tr>
<td>2</td>
<td>6 and 20</td>
<td>22.5</td>
<td>176</td>
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<td>4</td>
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<td>1</td>
<td>9</td>
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<tr>
<td>1</td>
<td>11</td>
<td>17</td>
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<td>Total:</td>
<td>20</td>
<td></td>
<td></td>
<td>4.080</td>
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</table>
part of the extracted explosive
part of the team
Conclusion

1. Special piety is necessary to be given to the deceased at Pula and Zadar airport and their sacrifice should never be forgotten.

2. Airports and their runways were mined in commando way with fuses, detonating capsules and explosives which were in formation usage in ex-Yugoslavian Army and were developed in the Institute for security in Belgrade.
Conclusion

3. Implied mining setting - the “sham”, the ”trap” and other non standard forms of mining, which ensures that explosion will occur and cause larger number of human casualties.

4. This way of mining, was opposite to all international conventions and regulations.
Crne Marame (Black Scarves)
Thank you for your attention!