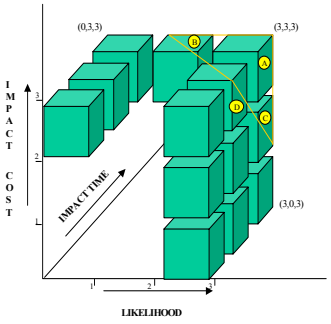
# ISEC-02 Rome 2003

Session 33 Room E – 24th September

## 3D Risk Matrix Methodology





Authors

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## 3D Risk Matrix Methodology

Concerns & Criticisms of 2D Methodology

- Complexity and interdependence not considered
- Lack of visualisation & communication
- Criticism about weighting from multiplication of factors
- Lack of flexibility in ranking of risks – use of integers obstructs outcome
- Subjective outcome causes concern
- Human factor interventions – strong characters imposing their opinion

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## 3D Risk Matrix Methodology

What is 3D Risk Matrix Methodology

- Considers risks in a 3D combination – e.g. Likelihood, Impact on Cost & Impact on Time
- Enables visualisation and communication
- Improves contribution/participation
- Improves positioning of risks in prisms and even further in pyramids
- Improves qualitative & quantitative output from the process
- Speeding up of process by focusing on critical areas

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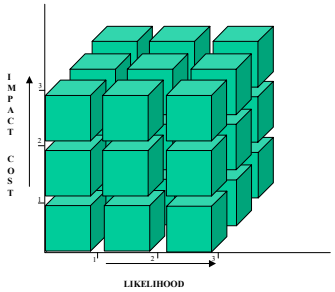


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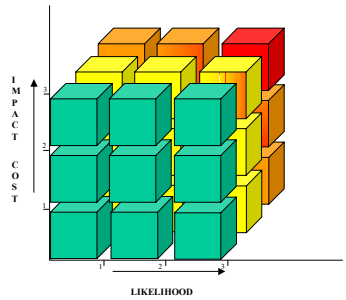


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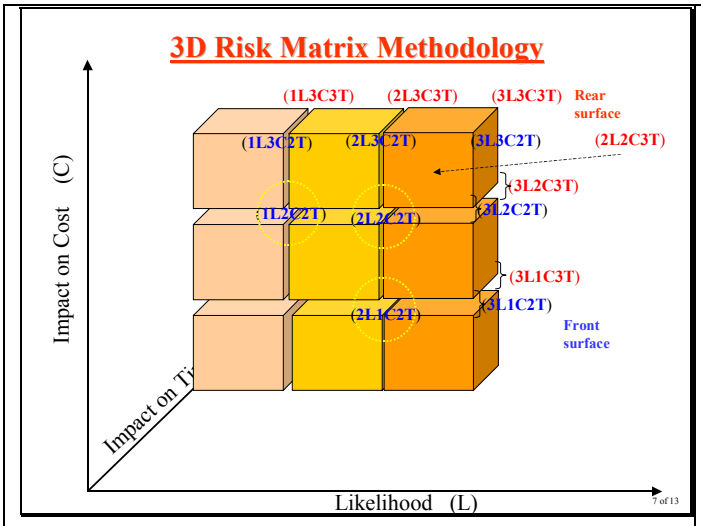
3D Risk Matrix Methodology
(1L3C3T)
(2L3C3T)
(3L3C3T)
Rear surface
(1L3C2T)
(2L3C2T)
(3L3C2T)
(2L2C3T)
(3L2C3T)
(1L2C2T)
(2L2C2T)
(3L2C2T)
(3L1C3T)
(3L1C2T)
(2L1C2T)
Front surface
Impact on Cost (C)
Likelihood (L)
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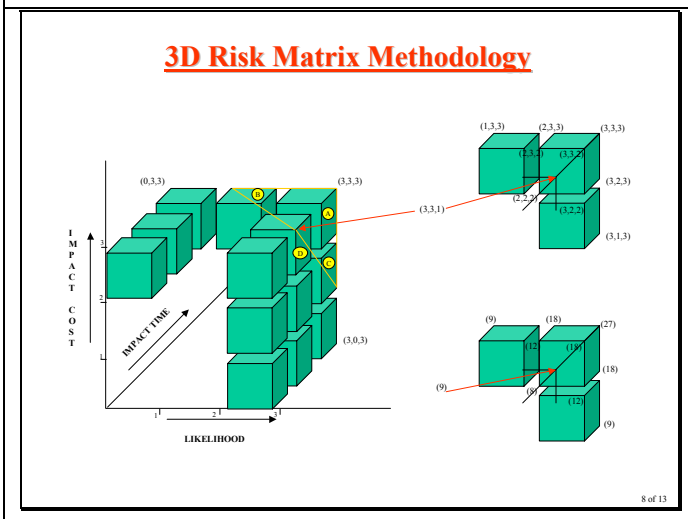
3D Risk Matrix Methodology
(0,3,3)
(3,3,3)
(3,0,3)
IMPACT COST
IMPACT TIME
LIKELIHOOD
(1,3,3)
(2,3,3)
(3,3,3)
(3,3,1)
(3,2,3)
(3,1,3)
(9)
(18)
(27)
(12)
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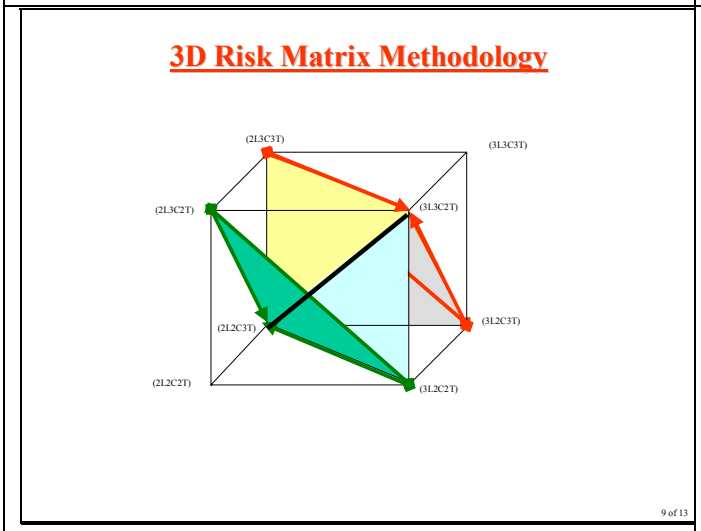
3D Risk Matrix Methodology
(2L3C3T)
(3L3C3T)
(2L3C2T)
(3L3C2T)
(2L2C3T)
(3L2C3T)
(2L2C2T)
(3L2C2T)
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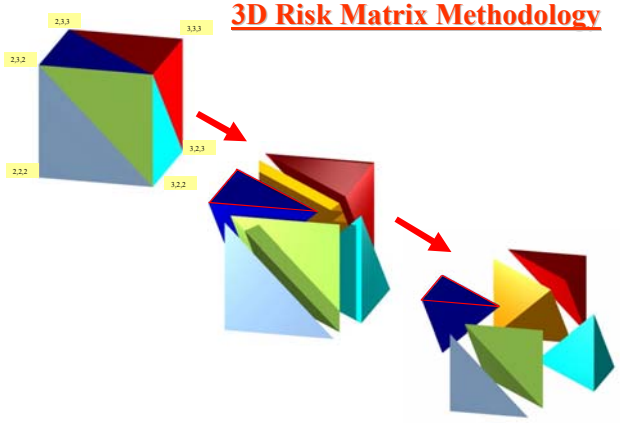
## 3D Risk Matrix Methodology

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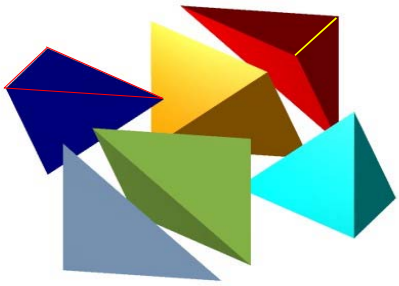
## 3D Risk Matrix Methodology



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## 3D Risk Matrix Methodology

**British Airways - T5 FMU**

At end of Outline Design

| Derby Ref. | Risk Ref. | Risk | L | C | PI | Translation to 3D terminology: Risks 4&5 = 3 | Risks 2&3 = 2 | Risks 1 = 1 | Coordinates | Risk Pyramid Level |
|---|---|---|---|---|---|---|---|---|---|---|
| | FMU_P12 | Architect design is not compliant with current (at time of construction) legislation. | 5 | 2 | RED | 3 | 2 | 2 | (3,2,2) | 4, 5, or 6 |
| | FMU_P14 | Architectural design is not compliant with current (at time of construction) legislation. | 5 | 2 | RED | 3 | 2 | 2 | (3,2,2) | 4, 5, or 6 |
| | FMU_P01 | Late availability of site to British Airways will result in a delay to construction of FMU. | 4 | 3 | RED | 3 | 2 | 2 | (3,2,2) | 4, 5, or 6 |
| | FMU_P07 | Delays to commissioning of new VCR by NATS will delay start of FMU construction. | 4 | 3 | RED | 3 | 2 | 2 | (3,2,2) | 4, 5, or 6 |
| | FMU_P13 | Unknown regulatory changes forces a design change. | 4 | 3 | RED | 3 | 2 | 2 | (3,2,2) | 4, 5, or 6 |
| | FMU_P16 | Restrictions imposed by CAA as a result of FMU structure casting shadows to sight lines from VCR. | 4 | 3 | RED | 3 | 2 | 2 | (3,2,2) | 4, 5, or 6 |
| | FMU_P23 | Local authority will reject site / space allowance being exceeded beyond PI scheme | 4 | 3 | RED | 3 | 2 | 2 | (3,2,2) | 4, 5, or 6 |
| | FMU_P06 | Site boundary may change due to redesignation and realignment of taxiways and taxilanes by BAA. | 3 | 4 | RED | 2 | 3 | 3 | (2,3,3) | 1, 2, or 3 |
| | FMU_P02 | Constraints imposed by planning as a result of non PI compliant issues | 3 | 3 | RED | 2 | 2 | 2 | (2,2,2) | Lower level pyramid RPL 6 |
| | FMU_P04 | Positive impact of Heavy Loadings to FMU roof design. | 3 | 3 | RED | 2 | 2 | 2 | (2,2,2) | |
| | FMU_P10 | Constraints imposed by LUL due to effects of heave on Piccy. | 3 | 3 | RED | 2 | 2 | 2 | (2,2,2) | |
| | FMU_P11 | Additional steelwork will be required in roof structure to oppose excessive vertical deflections. | 3 | 2 | AMBER | 2 | 2 | 2 | (2,2,2) | |
| | FMU_P18 | Clash with existing or future underground services. | 3 | 2 | AMBER | 2 | 2 | 2 | (2,2,2) | |
| | FMU_P19 | Site demise lines are not clear. | 3 | 2 | AMBER | 2 | 2 | 2 | (2,2,2) | |
| | FMU_P20 | Amount of decontamination required is not known | 3 | 2 | AMBER | 2 | 2 | 2 | (2,2,2) | |
| | FMU_P24 | Basement Construction / Foundation design needs to be re-visited | 3 | 2 | AMBER | 2 | 2 | 2 | (2,2,2) | |
| | FMU_P15 | Impact of fire due to close proximity of FMU/GRP to Fuel Farm. | 2 | 4 | AMBER | 2 | 3 | 3 | (2,3,3) | 1, 2, or 3 |
| | FMU_P28 | Environmental risks associated with chemical discharge. | 2 | 4 | AMBER | 2 | 3 | 3 | (2,3,3) | 1, 2, or 3 |
| | FMU_P17 | It is unclear to returns costs associated with 'Active' safeguarding of the MART (under FMU) from BAA. | 1 | 4 | AMBER | 1 | 3 | 3 | (1,3,3) | 9 |
| | FMU_P05 | Programme assumptions around method of procuring the FMU may be incorrect | 2 | 2 | GREEN | 2 | 2 | 2 | (2,2,2) | |
| | FMU_P25 | Vibration from underground trains may affect operations | 2 | 2 | GREEN | 2 | 2 | 2 | (2,2,2) | |

Risks identified at Design Team meeting held on Thursday 21 November 2002

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with BA/Vector Management permission

Comparison of methods

## 3D Risk Matrix Methodology
## What Next?

Further Development

- Work on the APM Risk SIG guidelines – cardinal, linear and non-linear scales
- Introduction of different axes, or combination of, e.g. Cost and Safety, Cost and Environment, etc.
- Use of vectors??!!
- Use of 3D RM method to consider opportunities as well as risks
- Possibilities of combining CAD and Risk Analysis software to improve output

Practicality

- Implement on workshops
- Feedback from questionnaires

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