



Radiological Protection Institute of Ireland
An Institiúid Éireannach um Chosaint Raideolaíoch

EPRAN Surveys

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CYBERKNIFE (MAY 2012)



Cyberknife

- First cyberknife in Ireland – private hospital
- Retrofit of existing CT Simulator room
- American design team– interaction with Irish RPA (QE)
- Primary shielding not required for all 4 walls in US
 - IDR not a concern



Experience with Cyberknife Shielding

Sweden

- **No Cyberknife facilities**
- **Radiation Therapy Regulations require:**
 - Shielding to ensure member of public will not receive >0.1 mSv
 - Valid for Cyberknife
 - Although dose constraint for exposed workers 100 mSv/5 years room must be designed for criteria of general public



Experience with Cyberknife Shielding

Czech Republic

- **One Cyberknife facility**
- **Shielding Criteria:**
 - 1 mSv/year for exposed workers
 - Primary shielding for all 4 walls
 - Facility designed for 6 patients/day
 - Concrete walls 1 metre thick (density 3.300 kg/m³)



Experience with Cyberknife Shielding

Germany

- **Use DIN 6847 – 2 (2008) for medical electron accelerators**
 - Does not include Cyberknife but with some restrictions can be used for Cyberknife
- **One Cyberknife facility**
 - **All walls have primary shielding**
 - with exception of small part of ceiling which cannot be reached by beam
 - **First unit in country – initial approach cautious**
 - **With experience believe shielding can be reduced in new facilities**
 - Based on useful beam not hitting every point of shielding at one time



Experience with Cyberknife Shielding

- **Slovenia– no cyberknife facilities**
- **Norway – no cyberknife facilities**
- **UK – few facilities, but no inspections yet
(no licence required in UK)**



RPII design requirements

- Dose constraints (developed for linacs)
 - 1.0 mSv/yr – exposed workers
 - 0.3 mSv/yr – members of the public
- Instantaneous Dose Rates (IDR)
 - 20 μ Sv/hr – exposed workers
 - 7.5 μ Sv/hr – members of the public



Floor Space

	Room dimension (m)
Recommended	6.4 x 6.7
Minimum	5.5 x 5.8
Absolute minimum	4.88 x 5.8



