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Digest of Conference materials is presented in 3 parts. It is interesting for a wide range of researchers, teachers, graduate students and professionals in the field of innovation and information technologies.

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ACTUAL PROBLEMS OF BUILDINGS AND ROOMS PROTECTIONS FROM STRONG EM FIELDS

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The problem of buildings and rooms mounted electronic equipment protection from strong EM pulse is considered. Special buildings design tasks are listed and main trends are pointed.

Keywords: EM protection, shielding, information security

If external EM field level is sufficient, building mounted electronic equipment failure, data violation or in some cases physical damage of equipment are possible. The effective protection against premeditated and unpremeditated strong EM pulse (EMP) is required [1].

Information security has the highest priority. Secret data must be protected from unauthorized distortion, removing or damage by any way including EMP. Critical citizen and military telecommunication objects are implemented as special purpose buildings. The base electronic systems protection methods must be implemented. They are shielding, RF interference filtering, grounding, shielded zones. It requires integrated approach.

In last decade EM protection requirements for telecomm objects are mandatory for special purpose buildings design. This feature is closely connected to electromagnetic terrorism threats, high critical information security requirements, high EMI vulnerability for the high speed electronic systems and highly developed local networks. EMI shielding and integrated approach requirements mean, that not only electronic engineers, but architects and builders must know EMI shielding constructions design and test methods.

It after tests building design revision will be needed, then tests will be again need to conduct. It makes building more expensive and prolongs design period. It confirms, that scientific based building design references need to be used. This references increases building quality and minimizes risks, that EM shielding features will not meat specifications.

Special purpose building design involves specialists in various fields. This problem solving requires integrated approach, clear coordination and high qualification. Project, EM shields constructions and test methods design need to be conducted by EMC engineers and information security engineers. Specific architecture and building tasks need to be conducted by architecture specialists. But all that specialists in one of this fields must to have qualification in other of these fields. Higher school did not training this integrated qualification specialists. This factor influences to actual projects supply, which is highly demand.

The necessity of EM protection expanded as to EM problems, so to equipment protection. This equipment variety is beyond military and civil EMC applications. Because there is no developed EM shielding theory for building constructions, technical solutions are often expensive, because they are excessively, or have sufficient disadvantages, which violates fundamentals of EM shielding. EM shielding references developing is necessary by this reason. This reference provides basis of various effective shielding aspects to developer. Effective shielding developing specific tasks are following:

- material selection. This materials must provide effective EM shielding and meet constructive requirements, depending on application.
- construction and shields element connection methods, which provides minimal shield discontinuity.
- heating, ventilation, and air conditioning and power supply inputs design.
- EM protected access control systems and equipment transporting systems design.
- test methods select and implementation. Test methods must provide data to check EM protection requirements.

Shielded rooms design theory and practice for special purpose buildings can be considered as new trend: architecture shielding.

General shielding concept provides setting up one or more obstacles in form of metal shields on EM wave way from interference emitter to receiver. Global protection is desirable when it is need often to move or remount sensitive equipment inside shielded area. The fallback of global shielding is function conditions dependency for entire system from shield elements quality (shield, filters, grounding). If one of these elements is interrupted, entire system failure is possible. Shielding by zones is alternative to global shielding. Several EM protection lines are applicated. Is the general description of integrated shielding system. It convenient to describe this system as topological model. It is need to match system configuration with equipment protection design rules. Shield topology should be optimal for certain configuration, i.e. to provide necessary protection level at minimal project cost.

The topology of shielding system must be developed in such way, that it would be possible to change its configuration in definite borders. Shielding zone boundary must not interrupt, for examples by reason of new open areas addition. All modifications are need to be considered by EMC experts, that guarantees EMC requirements implementation.

Grounding system must be implemented not only with purpose of safety, but considering its EMC efficiency. At present time general shield efficiency to zone shield efficiency distribution problem remains actual. It is need to know as technical problem aspects, so economical special purpose buildings aspects, which provides maximal project profitability.

It is need to pay attention to testing of just made object in shield efficiency. Usually the test equipment is not building company property, but this equipment needs EMC experienced operator. Otherwise test results may be nonsense, that leads to costly retesting and needless reconstructions. It is need to conduct test at building stage and finish test after all operations are completed.

If it is need to implement architectural EM shield at building stage, then it is to provide special training of building staff, which implements EM shields.

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