The Official Publication of the
Institute of Real Estate Management
www.irem.org July/August 2001

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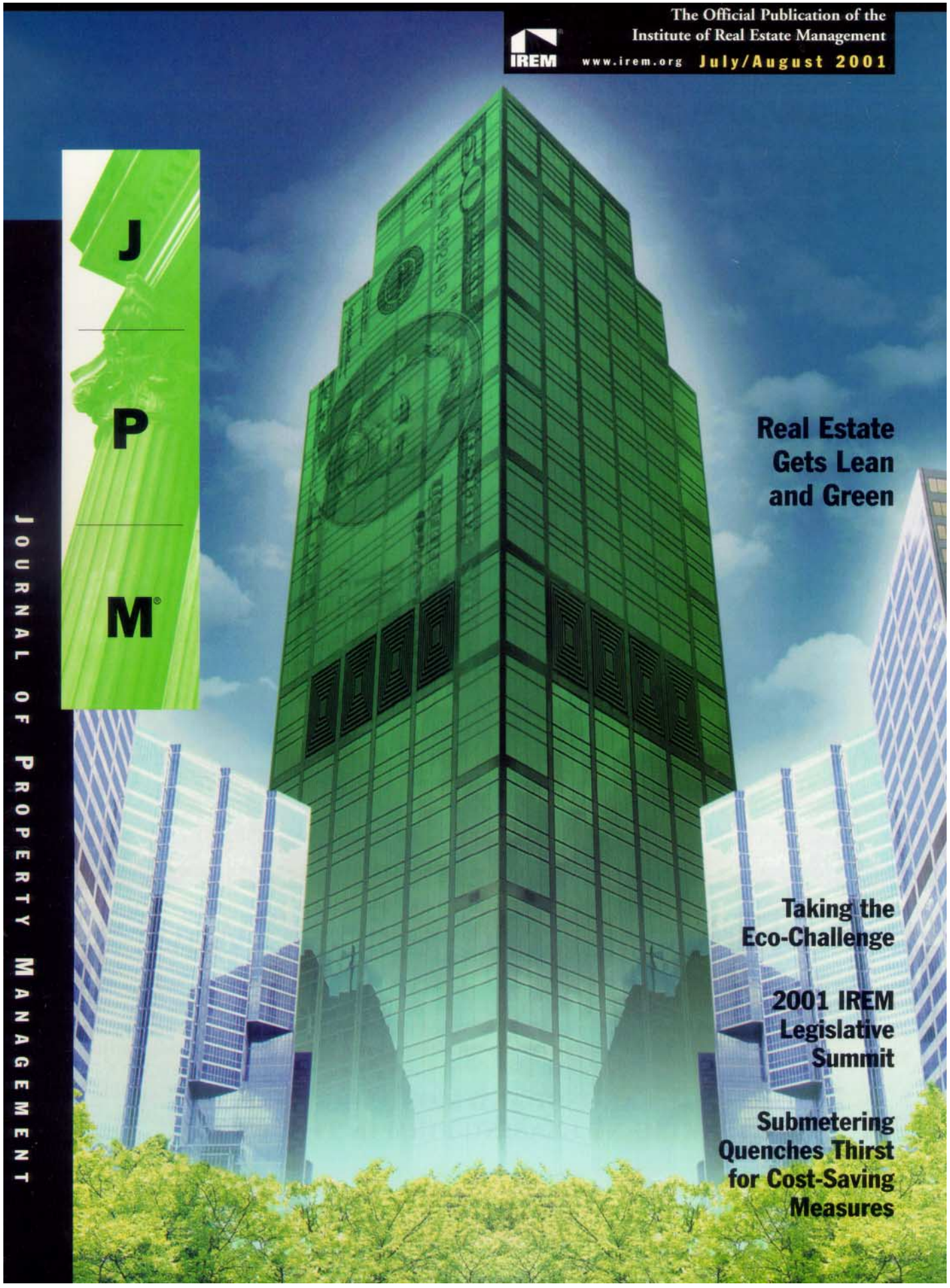
JOURNAL OF PROPERTY MANAGEMENT



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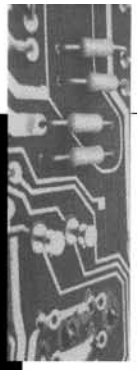

Radio Frequency Safety Concerns on Building Rooftops

by Richard Strickland

Rooftop antennas seem to be the norm these days. Those fortunate enough to own a building in the right location can generate a considerable amount of revenue from leasing the space to wireless systems operators and other types of communications services companies. Yet not everyone understands that the transmitted electromagnetic energy from cell phones, pagers, and two-way radios—used by business and fire, police, and emergency services—can present a hazard when you get close to the antennas. The energy emitted from these antennas is the same form of energy used in a microwave oven—get close enough to the antennas and it can make you sick or even cause permanent biological damage by overheating your body. Building owners and managers should be concerned about the safety risks associated with authorized and unauthorized access to their rooftops or other antenna areas.

Radio frequency (RF) radiation, RF emissions, electromagnetic energy —whatever you choose to call it—is a hot subject today supported by new FCC regulations that have brought increased awareness of RF radiation issues. The most recent FCC regulations and increased attention from OSHA seem to have caught many organizations by surprise, although it has taken years to gain the knowledge and visibility this subject has today.

Where are we today? First, RF radiation should not be confused with the far more dangerous ionizing radiation that is generated by X-rays and radioactive materials. Quite simply, non-ionizing radiation, which is based on radio (RF) and light frequencies, can overheat your body in the same way that a microwave oven cooks food.

Potential Dangers

Today, radio frequency radiation exposure concerns are no longer limited to individuals who work in the electronics industry. The explosion of wireless services and the location of all types of antenna systems on rooftops have changed all that. Those who own or manage buildings in the right location can generate revenues of hundreds of dollars per month per antenna from wireless-system and radio-system operating companies. This is a tempting opportunity to generate more income—one that should be taken. But it is important to understand this new revenue stream does not come without increased risk and responsibilities.

Although these wireless services operate at much lower power levels than radio and television broadcast systems, they still represent a potential hazard because people can get very close to them. Stand 15-20 feet from even the highest power wireless system antennas and you are below the Maximum Permissible Exposure (MPE) levels defined in the FCC regulations. But exposure levels increase dramatically as you get closer. The exposure level is four times higher if you cut the distance in half. And at a tenth of the distance, the levels are 100 times higher!

The biggest problem with rooftops is the large number of people who may require access. HVAC and elevator repair people, exterminators, painting contractors, window washers, building maintenance, and real estate practitioners all may need to access rooftop areas. Most have little or no knowledge of RF radiation. When multiple antennas are located on rooftops, it is easy to exceed the FCC regulations in some areas of most rooftops.

What is the potential result of overexposure to RF radiation? Under certain conditions, it is possible to become ill or, even worse, suffer prolonged health effects. In today's litigious society, building owners and managers can face lawsuits even when there is no proof of permanent biological damage. Just having someone prove (or claim) that they were exposed to RF field levels that exceed the FCC regulations may be enough to fuel costly legal battles.

RF Safety Plan

As building owners and managers, some simple actions will allow you to take advantage of rental opportunities while significantly reducing the likelihood that someone might be overexposed. First, and most important, you must develop a plan and implement it. That means you need a written RF Safety Plan. If it isn't written it is useless. An inspector from any federal, state, or local agency will always start by asking if you have a plan. If you answer yes, they will want to see a copy. This plan does not need to be complicated. All health and safety plans have the same basic components. The following eleven program elements form a complete RF safety program.

1. Written Documentation of the

Program. If it isn't written, you do not have a safety program.

2. Management Support. A safety program must have the full backing of management if it is going to work.

3. Education and Communication. The safety program must be communicated to your employees and they must understand the work rules, procedures, and policies that they are expected to follow. For rooftops, the simplest training is to have first-time visitors watch a 20-minute video and a handful of slides that explain the rules specific to the site. Then, have them sign a document that states that they understand and promise to follow the rules. Attorneys will use more precise language but this is what you are after. Only then are these people authorized to go onto the rooftop.

4. Enforcement of Your Safety Program. A safety program filed away in a drawer is not a safety program. You must use it!

5. Identification of Hazard Areas. You should have a reasonable idea where the field strengths may exceed the Maximum Permissible Exposure (MPE) levels for both Occupational/Controlled areas and for General Population/Uncontrolled areas. However, this is often not practical since conditions change every time one of the operators updates a system or you rent out space to another operator. Today, most operators have taken the approach that everyone who works in or visits a rooftop area must wear an RF personal monitor.

6. Marking and Control of Hazard Areas. Once potential hazard areas have been identified, i.e., by making some measurements, they have to be marked. Signs and perhaps physical barriers, such as chains and fences, are needed. If you require the use of RF personal monitors, a sign can be placed at the rooftop access. This sign basically states that certain areas of the rooftop may exceed FCC guidelines and that only authorized visitors wearing the proper safety equipment are allowed.

7. Controls and/or Work Practices. Establish work practices. For example, have both visitors and employees wear RF personal monitors whenever they are on the roof. Both groups must understand how to react to an alarm condition. A short video will prevent overreaction as it informs them of what to expect and how to respond. For example, if the monitor starts to "beep" they should not panic because biological problems do not happen instantly. In fact, exposure is averaged over six minutes.

8. Employee Involvement in the Structure and Operation of the Safety Program. Adherence to the safety program starts with the employees. First, they must believe in the need for a safety program. Then, they must understand the rules and procedures of your safety program. Get them involved.

9. Medical Program. No, you do not need to send employees for routine physicals. But, there are two things you do need to do. First, all employees who are expected to work in areas with potential exposure to RF fields above a modest level, i.e., the General Population/Uncontrolled MPE levels, should be screened to identify those with medical implants that contain electronic circuitry. Pacemakers are only one of many implants routinely used today. Unfortunately, there is a substantial risk that devices will malfunction at field strengths far below the FCC MPE limits. Such people need to know that their potential exposure risks are greater, not from a purely biological response but for electromagnetic compatibility (EMC) which may result in erratic functioning of their implant.

Second, the safety program must have provisions to handle overexposure incidents, whether real, or ultimately found to be unsubstantiated. Severe situations will require a physical exam. All incidents should be documented using a standard form that helps you quantify and record the level of the exposure. Often, a reported overexposure incident is found to be fully within the FCC regulations once the elements of whole body averaging and time averaging are considered.

10. Scheduled Reviews of Your Safety Program. Your safety program should be reviewed annually so that deficiencies can be identified and resolved. In some cases, such reviews may lead to procedural changes that improve operations without compromising employee safety. A review of all incident report forms (see #9) is crucial.

11. Assignment of Responsibility. Someone in your organization must be clearly identified as the RF safety person. This individual will normally have other duties but must have the necessary authority and resources to implement and enforce all aspects of the safety program (see #2).

By following these basic guidelines, you can help ensure the safety of those individuals authorized to access your building rooftop.

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