5.1 General Building Mainenance

George Duncan, CAO, City of Richmond

You can start saving energy today. Try these three simple strategies:

- ***Give your computer the night off.*** *Turning off just one computer and monitor at night and on weekends results in annual cost savings of $44. For computers that must be left on after hours, still turn off the monitor. Monitors consume over 2/3 of the total energy required to run a computer*
- ***Reduce your paper trail.*** *Use electronic mail and fax modems to avoid the energy cost of printing messages. As an added bonus, you'll also save paper*
- ***Turn off the lights.*** *Just like your mother said, lights should be turned off whenever an area is unoccupied. Consider installing occupancy sensors for greater convenience.*

Source: BC Hydro Business Energy Tips.

Building Maintenance is an area of municipal operations that has seen enormous changes since the advent of "smart buildings" and the increased focus on energy conservation and workplace safety. Gone are the days of buying the least expensive paint, carpet or fixture. Purchasers should now consider a wide variety of immediate impacts on users of a facility, as well as longer-term implications on operating budgets.

By and large, products containing commonly recognized, potentially "environmentally hazardous" products (such as products containing asbestos, PCB's or lead) are no longer offered for sale in Canada. But many older facilities still contain materials where these products can be found.

For example, asbestos was used in a wide variety of products. As recently as the 1970's asbestos was found in ceiling tile, linoleum flooring, insulation and even in water mains. In many instances proper management to ensure that particles don't break off and become airborne (thus becoming a danger to lungs) has minimized its hazards.

Another example concerns paint. Durable paints were traditionally oil-based and many paints commonly contained lead additives. Both of these procedures have long term environmental impacts. New paint products are water-based formulas and the more toxic additives are generally relegated to special applications.

Sections 5.1.1 through 5.1.8 deal with the most typical "day to day" building maintenance purchases. They do not deal with heating, ventilation, or air-conditioning systems that are typically engineered under larger scale contracts and require particular specifications.

Consider the following "Rules of Thumb" for most typical "day to day" Building Maintenance Selection:

- Reduce materials used and use materials efficiently
- Optimize space to reduce overall building size
- Specify standard dimension materials to reduce waste
- Use interior finishes that are durable or improve indoor air quality
- Specify materials with the best life-cycle environmental profile
- Look for durable and low-maintenance materials
- Match material life span to life span of the building
- Select materials that need infrequent recoating or refinishing
- Reject materials that need cleaning with high-emission cleaners
- Use materials readily recycled or reused
- Select biodegradable materials or products that can be recycled with existing technologies and collection programs
- Choose adhesives, paints, sealants, and other materials with low or no volatile organic chemical (VOC)* emissions
- Find products that emit the least amount of other chemicals harmful to human health.

** A note for cross-reference.*
Some of 5.1 General Building Maintenance sections may also be applicable to Products and Services required for "Construction, Renovation, and Demolition" (Section 5.8).

** A note about VOC: What is it?*
Common to many products in the Building Maintenance category (and most any refined petroleum ingredient in any number of products), is the presence of volatile organic compounds (VOC). These are commonly the ingredients that give these products their distinctive smell. Examples are paint fumes, gas fumes, the "smell" of new synthetic carpet etc. VOC's react with nitrogen oxides in the presence of sunlight to produce ground-level ozone and photochemical smog. Reference to VOC appears throughout Chapter 5.

5.1.1 Paint

An Overview

Paints are among the most widely purchased products in the area of building maintenance. Paints are sometimes called "surface coatings" in reference material on specifications, as this is the class of product to which they belong. Surface coatings include paints, stains and varnishes.

These products range in environmental impact, but all have the potential to adversely affect the environment through improper use, waste, and end disposal.

- Latex and acrylic paints (water based) are generally considered less damaging to the environment than oil based paints.
- Oil based paints have traditionally been called "enamels", "stains" and "varnishes". Their application has generally been promoted because of durability in "tough wear" and adverse exposure conditions.
- Oil based paints in the past had used lead as an additive. This is no longer the case.
- In Canada, application of these coatings releases thousands of tonnes of volatile organic compounds (VOC) (see 5.1) into the atmosphere each year.

Paint is produced in a highly regulated industry governed by several associations. Paint products are produced to specific industry standards that also incorporate environmental criterion. There are many types of seals of approval or guidelines on which to rely when purchasing such product. For details refer to the " Specifications from Other Agencies and Seals of Approval" below.

Potential Environmental Impacts

- Volatile organic compounds (VOC) and fumes.
- Unused product disposal, if not performed properly, could lead to environmental problems.

Things to Consider If You Write Your Own Specifications

This is an opportunity to add clauses in paint specifications to address:

- Highest recycled content
- Recyclable products with "seals of approval"
- Low or no fumes (off-gassing) and preferably no volatile organic compounds (VOCs)
- Desired absence of mercury or mercury compounds
- Desired absence of pigments of lead, cadmium, chrome VI or their oxides that have recycled content
- Longevity of application.

Specifications from Other Agencies and Seals of Approval

Environmental Choice program guideline ECP-76
(details at www.environmentalchoice.com/guidelines/pdfs/ecp-76.pdf)
Governments Incorporating Procurement Policies to Eliminate Refuse (GIPPER)
(details at www.buygreen.com/main/gipper/paint.htm)
Green Seal GS-11
(details at www.greenseal.org/pdf/paint.pdf)

5.1.2 Insulation

An Overview

There are many thermal insulation materials on the market. They may be purchased as two types: plastic foam insulation or fibrous material. More thermal insulation is used now than in the past, as the trend has been to curb the use of energy and non-renewable resources.

In addition to the energy conserved by using insulation materials, increasing the use of recycled materials will reduce the amount of materials entering the waste stream and reduce total resource consumption. In the case of use of fibrous material and cellulose filler, recycled mixed paper has become a potential ingredient.

Potential Environmental Impacts

Potential environmental impacts include:

- Health hazards from dust and fumes during and after insulation
- Energy and resource consumption in manufacturing the product
- Incorporation of ozone depleting substances in the manufacture of the product.

Things to Consider If You Write Your Own Specifications

This is an opportunity to add clauses in insulation specifications to address:

- Highest recycled content
- Recyclable products with “seals of approval”
- Low or no fumes (off- gassing) and preferably no volatile organic compounds (VOCs).

Specifications from Other Agencies and Seals of Approval

Environmental Choice program guideline ECP-40
(details at http://www.environmentalchoice.com/guidelines/pdfs/ecp-40.pdf)
Energy Star
(details at http://www.epa.gov/appdstar/insulation/pdf/guide.pdf)

5.1.3 Sealants and Caulking Compounds

An Overview

Sealants and caulking compounds are used to fill and seal joints in buildings and other structures. They are applied to accommodate relative movement and significantly reduce unintentional air exchange. They assist in lowering heating and cooling losses and conserving energy.

The very reasons that these compounds have been developed to be soft and pliable results in their environmental impacts. The compounds dry very slowly, thereby remaining pliable. While longevity of application is sought, their slow drying results in long duration of off-gassing due to VOC (see 5.1).

Potential Environmental Impacts

- Many sealants and caulking compounds contain volatile organic compounds (VOC) which off-gas (release fumes) after application. Increased levels of VOC in buildings have been attributed to the use of sealants and may contribute to reduced interior air quality.
- Unused product disposal, if not performed properly, could lead to environmental problems.

Things to Consider If You Write Your Own Specifications

This is an opportunity to add clauses in sealant and caulking specifications to address:

- Highest recycled content
- Preference for products with “seals of approval”
- Low or no fumes (off- gassing) and preferably no volatile organic compounds (VOCs)
- Longevity of application.

Specifications from Other Agencies and Seals of Approval

Environmental Choice program guideline ECP-45
(details at www.environmentalchoice.com/guidelines/pdfs/ecp-45.pdf)

5.1.4 Adhesives

An Overview

Adhesives come in many forms and mixtures and are used for bonding in fabrication, maintenance and repair applications. Like sealant and caulking, many adhesives contain volatile organic compounds (VOC's) (see 5.1) that, when released, may contribute to reduced interior air quality.

Adhesives may be specified as one component required to complete a building maintenance job (e.g. re-flooring) or as a part of a pre-assembled item (e.g. cabinetry). In both these examples VOC and fumes could be adverse or left-over adhesive could become difficult to dispose of.

Potential Environmental Impacts

- Volatile organic compounds (VOC) and fumes.
- Unused product disposal if not performed properly could lead to environmental problems.

Things to Consider If You Write Your Own Specifications

This is an opportunity to add clauses in adhesive specifications to address:

- Preference for products with "seals of approval"
- Low or no fumes (off- gassing) and preferably no volatile organic compounds (VOCs)
- Longevity of application.

Specifications from Other Agencies and Seals of Approval

Environmental Choice program guideline ECP-44
(details at www.environmentalchoice.com/guidelines/pdfs/ecp-44.pdf)

5.1.5 Carpeting

An Overview

The vast amount of carpet manufactured and installed in North America is made of synthetic materials — nylon, polyester and polypropylene (PP) face fibres with most backings being a sandwich of polypropylene fabric and latex, or vinyl. Most commercial carpet is made by bonding a face fibre to a backing fibre, using one of a variety of strong bonding agents. Nylon accounts for nearly two-thirds of the face fibre market, with PP being the next most commonly used fibre.

Recycled content and recyclable carpet options each have their own merits and considerations, depending on specific need, location, and use. Nylon, polyester, and plastics are made from petroleum, a non-renewable resource. Since the face fibre backing can contribute up to 60% of the carpet material, purchasing a nylon face fibre with 100% recycled content backing is worth consideration.

Closed-loop systems, where used carpet fibre and backing are made into new carpet and backing (and which can be recycled into new carpet after its useful life) are important to consider. Leasing is another option for commercial applications; the manufacturer bears responsibility for replacing worn sections of carpet and recycling the used carpet.

Note that new developments have been made using recycled PET materials:

- 100 per cent of the yarn is extruded and spun from recycled polyethylene terephthalate (PET), principally derived from post consumer soft drink bottles
- Virgin fossil fuel raw materials are not needed to produce this carpet, saving several million barrels of crude oil per year
- The carpet is finished with materials that do not contain formaldehyde
- The carpet is dyed in high-pressure jet dye becks, eliminating the need for biphenyl ingredients as dye carriers. This method of dyeing uses approximately 66 per cent of the water needed for conventional dyeing
- PET recycling does not generate nitrous oxide nor emit nitrous oxide into the air, so it does not contribute to ozone depletion or global warming
- PET carpet production uses more than 40 million pounds of PET bottles per year that would otherwise have become landfill.

Potential Environmental Impacts

- Indoor air quality concerns from fumes given off by new or recycled synthetic materials may favour “natural materials” such as wool, cocoa matting, hemp and similar materials.
- Conventional synthetic carpets are made from non-renewable resources.
- Disposal issues at end of product life span.

Things to Consider If You Write Your Own Specifications

This is an opportunity to add clauses in carpeting specifications to address:

- Any extraordinary requirements for natural products or materials
- Highest recycled content
- Recyclable products with “seals of approval”
- Products that minimize volatile organic compound (VOC see 5.1) emissions
- Carpet that is not SB latex-backed (latex without 4-PC content)
- Products that contain natural or vegetable dyes and additives
- Colours that match natural soiling to hide dirt and stains
- A minimum 10-year warranty
- A minimum of 28 ounces per square yard for loop pile carpet and 34 ounces per square yard for cut pile carpet.

Specifications from Other Agencies and Seals of Approval

King County Environmental Purchasing Program, Environmentally Responsible Carpet Choices (details at www.metrokc.gov/procure/green/carpet.htm)

5.1.6 Ceiling Tile

An Overview

Ceiling tiles generally fall under the product category of acoustical products. By requiring products to have at least a minimum percentage recycled content, the amount of material entering the waste stream and total resource consumption will be reduced.

Ceiling tiles are generally designed to be light, to be acoustically deadening, and to be durable and low maintenance. At one time ceiling tiles had high asbestos content. Ceiling tiles are continuing to improve with the advent of new recycling technologies. However older properties requiring maintenance may still contain some of this product. Some products now on the market have a minimum of 70 per cent recycled content (mineral fibre). They are durable and tear resistant, so they can be reused.

Potential Environmental Impacts

- Health hazards from dust and fumes during and after insulation.

Things to Consider If You Write Your Own Specifications

This is an opportunity to add clauses in ceiling tile specifications to address:

- Desirability of tiles made from cellulose fibres, mineral and slag wool by-products and/or recycled fibreglass
- Tiles that do not contain asbestos fibres
- A high percentage of recycled content
- Preference for products with “seals of approval”
- Durable construction, low maintenance
- A product that meets all building and fire codes.

Specifications from Other Agencies and Seals of Approval

Environmental Choice program guideline ECP-35
(details at www.environmentalchoice.com/guidelines/pdfs/ecp-35.pdf)

Case Study: Energy Efficient Emissivity Curtains

Minoru Arenas

In 1991, in order to improve energy efficiency and reduce energy costs in Richmond’s Minoru arenas, emissivity curtains (basically large reflector blankets) were installed in the arenas’ ceilings. Richmond received a $41,000 rebate from BC Hydro on the total $67,000 cost of the project. In the first year alone Richmond realised energy savings of over $16,000.

Source: Internal report.

5.1.7 Roofing

An Overview

In the last few decades roofing in institutional commercial and industrial settings has been primarily a system of membranes and tar and gravel addressing the needs of "flat roofed" structures. Because of the use of tar, off-gassing and VOCs (see 5.1) are a concern.

With the advent of more diverse architectural styles and the retrofitting of existing flat roof structures to make use of urban space, more roofing material choices are available.

Potential Environmental Impacts

- Depending on material specified, air quality may be impacted adversely during time of installation.
- Depending on material specified, offgassing and VOCs may have a negative impact over longer term.
- Depending on material specified, there may be use of non-renewable resources.
- Disposal issues at end of product life span.

Things to Consider If You Write Your Own Specifications

This is an opportunity to add clauses in roofing specifications to address:

- Highest recycled content
- Preference for products with "seals of approval"
- Low or no fumes (off- gassing) and preferably no volatile organic compounds (VOCs)
- Longevity of application
- Aproduct that meets all building and fire codes.

Specifications from Other Agencies and Seals of Approval

Currently, most reliable roofers adhere to strict codes of practice developed by their industry, which provides long-term warranties on materials and labour. Specifications particular to environmental purchasing and such seals of approval are not common.

5.1.8 Walls (Gypsum-dry wall)

An Overview

Gypsum-drywall is one of the most used building materials of the last 50 years. Many older facilities may still have plaster walls but a combination of plaster and drywall is more the norm. Newer facilities likely have drywall construction as the norm.

Gypsum-drywall (called drywall or rock wall or gyproc) is made from gypsum based filler sandwiched between membranes. While designed to be a particularly fast and convenient way of installing walls to a stage ready for a prime coat of paint, disposal of the walls has an environmental impact. In a landfill, drywall breaks down, emitting the readily-recognizable rotten egg smell associated with sulfur. The gases formed create problems at landfills. Gypsum-drywall is readily recyclable for the production of new dry wall, and separate collection of gypsum-drywall during construction clean up and demolition is required by local legislation. Recycling facilities are also available.

Building maintenance purchases with regard to drywall will most likely not be influenced by specifications for a better drywall as the industry has well-accepted standards and the use of the EcoLogo is prevalent. The maintenance purchase will however be influenced by specifications for demountable (full wall) partitions as described in section 5.4.2

Potential Environmental Impacts

- End-of-use disposal is a potential problem at landfills.

Things to Consider If You Write Your Own Specifications

This is an opportunity to add clauses in Gypsum-drywall specifications to address:

- A high percentage of recycled content
- Preference for products with “seals of approval”
- Signs of durable construction, low maintenance
- A product that meets all building and fire codes.

Specifications from Other Agencies and Seals of Approval

Environmental Choice program guideline ECP-50
(details at. www.environmentalchoice.com/guidelines/pdfs/ecp-50.pdf)