BUILDING BIOLOGY

INFORMATION BOOKLET

Geopathic Stress/Building Materials/Hazards

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Contents

What is Building Biology and what does Building Biologist do?

Originating from Germany, Building Biology is a science that provides a holistic examination of the built environment and provides realistic solutions to create buildings that support the mind, body and soul. These hazards include everything from the products we use to air, water and biological contaminants (mould) as well as electromagnetic fields and geopathic stress.

Building Biology considers all aspects of the indoor environment in which we live and work for an average of 90% of our lives. The buildings in which we live and work should support and enhance the wellbeing of everyone in that building. (Australian Society of Building Biologists, 2016)

The World Health Organization states, that about 75% of all diseases are caused by environmental factors. In order to remain strong and well-balanced, we need healthy places and spaces to work, create, rest and recover. (Buildingbiology Services Australia, n.d.)

Building Biology is not…

- is not a look back on a seemingly ideal past, but the vision of a future worth living.
- is not primitive improvisation, but outstanding and responsible innovation based on aesthetic principles.
- is not formalism, but takes nature as its role model. (Nature also features an abundance of shapes and colors).
- does not limit itself to advantages of individual occupants, but also shows consideration for fellow humans and the environment as a whole.
- is not just about reducing the toxicity of individual building materials, but calls for a total approach to a healthy living environment.
- is not an additional luxury item for only a few, but will form the foundation of future building activities worldwide.
- is not too expensive, but includes the real costs up front, which in conventional building methods are passed on to the general public, the next generation and the environment.

(Institut für Baubiologie, 2016)

How can Building Biologist help you to design a healthy home

A Building Biologist is typically employed to conduct everything from electromagnetic field testing; air sampling for allergens, chemicals and particulates; provide advice on building healthy homes; provide recommendations on water filters; conduct pre-inspection audits; provide advice on healthy personal care and cleaning products and to identify and address geopathic stress.

Building a healthy home comes down to these basic principles that were developed by Professor Anton Schneider, founder of Bau-biologie.

These are summarised as follows:

1. Building site without natural and human-made disturbances
2. Residential homes away from sources of emissions and noise
3. Low-density housing with sufficient green space
4. Personalized, natural, human- and family-oriented housing and settlements
5. Building without causing social burdens
6. Natural and unadulterated building materials
7. Natural regulation of indoor air humidity through humidity-buffering materials
8. Low total moisture content of a new building that dries out quickly
9. Well-balanced ratio between thermal insulation and heat retention
10. Optimal air and surface temperatures
11. Good indoor air quality through natural ventilation
12. Heating system based on radiant heat
13. Natural conditions of light, lighting and color
14. Changing the natural balance of background radiation as little as possible
15. Without human-made electromagnetic and radiofrequency radiation exposure
16. Building materials with low radioactivity levels
17. Human-oriented noise and vibration protection

18. With a pleasant or neutral smell and without outgassing toxins
19. Reduction of fungi, bacteria, dust and allergens as low as possible
20. Best possible drinking water quality
21. Causing no environmental problems
22. Minimizing energy consumption and utilizing as much renewable energy as possible
23. Building materials preferably from the local region without promoting exploitation of scarce and hazardous resources
24. Application of physiological and ergonomic findings to interior and furniture design
25. Consideration of harmonic measures, proportions and shapes

(Institut für Baubiologie, 2016)

A building biologist can be a valued member of your new renovation/building team in a consultancy role, she can work in conjunction with your architect and builder to ensure that the right choices in materials and design in relation to your chosen location are optimized, so that the building would not just be green, but a healthy and supportive environment for your family.

A building biologist can also provide an expert advice on following areas:

- Indoor air quality (allergens like mould, dander, dust, dust mites; chemicals in cleaning and personal care products, furnishings etc.)
- Water quality (drinking/bathing water sources and water storage)
- The Electromagnetic Field/Radiation (potential sources inside and outside your home)

Basic Consultation

Basic Consultation can be conducted via email/Skype and **only** talks you through basics of different issues and gives you recommendations on how to create safe and healthy living space.

I start with identifying the specific needs of your family (you would need to fill in a questionnaire) and the requirements of your project (renovation/new building) and will give you recommendations on following areas (depending on a relevance to your project and your needs):

- Building design
- Building materials
- Allergens
- Chemicals (in cleaning and personal care products)
- Water quality
- Electromagnetic fields (EMF)

The cost of services vary according to the size and complexity of the job. A formal written report provided if requested.

For further information, please refer to http://househealingsolutions.com.au/

Detailed Consultation

My role as a building biologist is to be part of the whole project and work in conjunction with your architect and builder from the beginning until the end of the project.

I start with identifying the specific needs of your family (you would need to fill in a questionnaire) and the requirements of your project (renovation/new building) and will give you recommendations on following areas (depending on a relevance to your project and your needs):

- Building design
- Building materials
- Allergens
- Chemicals (in cleaning and personal care products)
- Water quality - assessment of drinking and bathing water sources and water storage, which concentrates on identifying any potential contaminants that may arise from the pipes to storage vessels. The health concerns associated with water will depend upon the source of drinking water, whether tap, tank, bore or bottled. Building Biologists can test your tap water for different contaminants and will recommend a water filter system for most households.
- Electromagnetic fields (EMF) - a comprehensive assessment identifying all potential EMF sources inside and outside your home by testing electrical, magnetic and high frequency radiation. Exposure to power lines, fuse and meter boxes, household electrical appliances are all tested, also sources of radiation from smart meters, phone towers, mobile phone base stations, wireless (WIFI) technologies and DECT (cordless) phones. The difference between what is regarded as a safe Australian exposure standard and what is regarded as a safe Building Biology standard is explained.

This consultation includes EMF, indoor air quality and water quality testing (depending on a relevance to your project and your needs).

I will:

- Personally discuss your specific concerns and requirements.
- Visit your site at a time that suits you best.
- Take digital readings of EMFs in all areas of the home or business using the latest technology meters from Germany.
- Explain each source of EMF personally and provide solutions.
- Secure the appropriate equipment and will conduct the specific air sampling / testing (if needed).
- Take water samples (if needed). *Samples may need to be sent to a NATA approved laboratory for analysis.*
- Explain the results and provide effective solutions.
- Provide a formal written report (up to 20 pages) detailing all readings and recommendations, if required. Otherwise, recommendations and advice will be provided informally via email/Skype throughout the project.
- Answer any questions you might have via email/Skype within 6 months after the project has finished.

If laboratory tests and/or analyses are involved then I will utilise NATA (National Association of Testing Authorities) approved laboratories. *Extra fees apply for laboratory analysis.*

For further information, please refer to http://househealingsolutions.com.au/

Targeted Consultation

This Targeted Consultation is a great option if you are setting up a space e.g. nursery, playroom or bedroom.

This audit will give you an indication of what is going on. With regards to EMF, by only assessing one room, it is unlikely that you will get a full picture though.

One room/area is assessed for:

- Allergens
- Chemicals (in cleaning and personal care products)
- Electromagnetic fields (EMF)

I will:

- Personally discuss your specific concerns and requirements.
- Visit your site at a time that suits you best.
- Take digital readings of EMFs using the latest technology meters from Germany.
- Explain each source of EMF personally and provide solutions.
- Secure the appropriate equipment and will conduct the specific air sampling / moisture testing (if needed). *Samples may need to be sent to a NATA approved laboratory for analysis.*
- Explain the results and provide effective solutions.

You will receive a written report (up to 10 pages) including recommendations and solutions. Any questions you might have will be answered via email/Skype within 6 months of the consult. The cost of services vary according to the size and complexity of the job.

For further information, please refer to http://househealingsolutions.com.au/

Site selection and geopahtic stress

To determine the most appropriate position for the building when considering a site:

- Include a soil analysis as well as Geo survey. The Geo survey includes detecting the proximity to power lines, distorted underground energy fields and water veins.
- Take into consideration the microclimate – prevailing winds, solar orientation, technical electromagnetic sources, local land use past and present, air and water flow.
- Make decisions regarding ventilation, heating and insulation – try to employ as much solar/radiant heating rather than convection heating as possible, retaining radiant heat for the cooler months, insulating againts warmer months and maintaining a fresh air supply all year round that is suitable for the buildings use. Insulation materials need to be efficient but must not release toxic gases or harmful particulates into the air mass.
- Avoid all technical electromagnetic fields as much as possible through careful wiring diagrams and avoidance methods. Consider installing demand switches to cut off circuits when not in use of shielded and grounded wiring.
- Select lighting and furnishings that are suitable for the room orientation and use, as well as being suitable and in harmony with the occupant´s lifestyle ad personal needs. Furniture materials should not off gas or assist in the creation of static electricity.
- Design the building to be ecologically sound, healthy, harmonius to life and ergonomic to occupant´s needs. (Bijlsma, 2012)

Geopathic stress may arise from both natural and man-made activities i.e. mining and excavation. Daily disturbances of the earth's magnetic field produce variations in geomagnetic activity which is reportedly associated with widespread effects on human health and behavior including the way in which we dream (Lipnicki, 2009).

There are different types of geopathic stress:

Geological faults – deep crack in the bedrock which allows radiation from deep within the earth to come up to the surface.

Geomagnetic lines – derived from the earth's magnetic poles, these lines travel in a corkscrew manner, moving in a north to south direction and are 1 to 2 meters wide.

Water courses – the movement of underground water through rock gives rise to a weak field which distorts the earth's magnetic field.

Hartmann & Curry grids - these grids are global network of electrically charged lines that relate to human consciousness (Hartmann Grid) and the consciousness of the planet (Curry Grid).

Place memory – according to geomancers, spaces have the ability to remember and store emotionally charged events. Residues of strong emotions such as anger are imprinted on a site after an argument.

Ley (story) lines – are channels of energy that are created by thought and powered by emotion. Put simply, we create a connection to other people, pets, places or objects when we think about and emotionally respond to them.

Symptoms of geopathic stress may range from unexplained fatigue, sleep disturbances, mental and behavioral disorders to infertility, miscarriages, and chronic immune problems such as cancer. This is more likely to arise if the person's bed is situated above the stress.

The simplest and most cost effective way to address geopathic stress is to not spend time in them. Once you have determined where the stress is, move the bed, couch, desk and any other area in which you spend time out of its way. (Bijlsma, 2012)

Building materials and furnishings

The best building materials and furnishings are those with neutral or pleasant natural scents that do not emit toxic paints/glues/sealants vapours, and are unadulterated and derived from natural resources. The materials chosen should not adversly affect the elctro climate, or contribute to poor indoor air quality, or moisture related problems, or adversely impact the environment.

A building biologist will rate a material using the following criteria:

- Natural occurance
- Ecological impact
- Energy consumption
- Thermal properties
- Acoustic properties
- Diffusion (breathing) properties
- Hygroscopicity
- Toxic vapours
- Electrical properties and radioactivity
- Health impact

(Bijlsma, 2012)

Flame retardants

Flame retardants have been used in consumer products for decades to reduce fire incidence and property damage. They are used in plastics and polyurethane foam, as well as in the electronics industry and are consequently found in an array of office and household items including upholstered furniture, mattresses, pillows and carpet underlay, computer casings, phone handsets, stereos, DVD players and televisions, building materials, coated wires and our clothes (Lorber, 2008).

Brominated flame retardants are accumulating in the environment and there are serious concerns about their impact on human health (cancer, birth defects and a host of neurological and reproductive disorders in developing foetuses) (Birnbaum and Staskal, 2004).

Paints/glues/sealants (Volatile Organic Compounds)

These products are the major cause of poor indoor air quality in a new home, with many containing ingredients that cause fatigue and headaches to more serious conditions such as Multiple Chemical Sensitivity and cancer.

Volatile Organic Compounds can be significally reduced by choosing alternative paints and by enhancing passive ventilation.

Polyurethane sealants and adhesives should be avoided regardless as to whether they are water or oil-based. Polyurethane is made from toxic chemicals including cancer-causing di-isocyanates, formaldehyde and phosgene. Acute exposure which often arises when timber floors are sealed will cause burning of the eyes, chest tightness, headache, nausea or vomiting. Long term exposure to lower levels may irritate the eyes, nose and throat, and may cause lung problems such as chronic bronchitis and asthma. Those who become sensitised to the di-isocyanates will experience an asthma attack every time they are exposed to it.

Formaldehyde is used as a preservative in some paints and varnishes, glasswool and rockwool insulation and as an adhesive (resin) and binder in pressed wood products. (Bijlsma, 2012)

Formaldehyde resin – a known carcinogen – is commonly used in particle board such as MDF, used extensively in homes (International Agency for Research on Cancer, 2004).

Many low VOC paints, do not take into consideration the VOCs from pigments that are consequently added to them.

Indoor paints and sealants should not only be low or no VOC, they should also be porous and therefore permeable to water vapour in order to prevent mould becoming a problem. (Bijlsma, 2012)

Infants spend most of their time sleeping and are likely to be exposed to elevated concentrations of chemicals released from their crib mattresses. The test results by Boor, Järnström, Novoselac and Xu Y suggest that crib mattresses are an important source of VOCs and infant exposure to VOCs are possibly elevated in their sleep microenvironments.

Plastics

Plastics are derived from petrochemicals and are common source of volatile organic compounds (VOCs). However it is the chlorinated plastics such as polyvinyl chloride (PVC) used in building materials that pose the greatest health and environmental risks. PVC is used in a wide variety of building materials (vinyl siding, window profiles, vinyl flooring, furniture, conduit, wiring, cables, pipes and fixtures), food packaging, portable electronic devices, signs, toys, medical equipment, shower curtains, car interiors and some textiles.

Alternative to plastic in building materials should be sought wherever possible. (Bijlsma, 2012)

Treated timber

Unsealed timber is an excellent material from a building biologist perspective because it is hygroscopic – it has the ability to absorb and release moisture, has good thermal properties and is derived from a natural renewable resource (providing it is certified with the Forest Stewardship Council).

Engineered timber products include plywood, particleboard, chipboard and medium density fibreboard (MDF) commonly found in wall panelling, shelves, countertops, cabinetry and furniture. They are made from wood chips glued together with formaldehyde. It can take up to five years for formaldehyde to `off gas` in a home which is why it should be avoided.

Wood preservatives are used to extend the life of the timber by protecting it against rot and pest infestations. Chemical wood preservatives are classified as pesticides and include CCA (copper chrome arsenate), creosote and pentachlorophenol. CCA treated timber is of particular concern because it was used for decades in playground equipment, decks, power poles, benches, tables, fence posts, pergolas, packing cases, wall frames and cladding. Arsenic can cause a variety of health problems including cardiovascular disease, diabetes and adversely affect the immune and neurological systems as well as cause cancer. Chromium VI is a known teratogen (causes birth defects) which irritates then skin and mucous membranes.

Building biologists strongly suggest that no CCA treated timber is used for any purpose around your home.

The best solution is to choose naturally rot-resistant woods. These timbers are resistant to decay due to high levels of sap or `extractives` in them. Natural wood preservatives include linseed and tung oil. (Bijlsma, 2012)

Lighting

The ideal form of light for human health is sunlight. However, as it is not always possible to achieve this in every room of a building, it is important to choose lights based on the impact on health as well as energy efficiency. This is particularly important if you suffer from depression, migrane headaches, photosensitive epilepsy or electrical hypersensitivity.

Encouraging the use of Compact Fluorescent Lights to conserve energy and save the environment is ironic given that it releases toxic mercury vapour when it is disposed of, which is disastrous for human health and the environment. (Bijlsma, 2012)

Hazards

Asbestos

If your home was built between 1945 and 1980, it is strongly recommended that you get it properly tested and any asbestos removed by a licensed professional before you renovate. There have been children who have developed asbestos-related diseases later in life as a result of being exposed to asbestos fibres when their parents renovated their home. (Bijlsma, 2012)

Synthetic Mineral Fibres

Synthetic mineral fibres have replaced asbestos as a form of insulation and include rockwool, glasswool, fibreglass and ceramic fibres. Cheap bats imported from foreign countries may contain high amounts of formaldehyde – a known carcinogen. (Bijlsma, 2012)

Lead Dust

If your home was built prior to the 1970s, there is a good chance it will have lead paint. Lead dust is extremely toxic to children and pregnant woman and requires special precautions when renovating. (Bijlsma, 2012)

Mould

When building or renovating a home, it is critical that you prevent moisture related problems developing in the first place.

An estimated 1 in 3 homes in Australia and 1 in 2 homes in the USA exhibit signs of indoor dampness such as water leakage or visible moulds on walls, floors or ceilings.

Fungal survival and growth are influenced by several environmental factors:

1. Moisture
2. Temperature
3. Light
4. Nutrient concentration (what building material they sit on)

According to US EPA, molds are usually not a problem indoors, unless mold spores land on a wet or damp spot and begin growing. Molds have the potential to cause health problems. Molds produce allergens (substances that can cause allergic reactions), irritants, and in some cases, potentially toxic substances (mycotoxins). Inhaling or touching mold or mold spores may cause allergic reactions in sensitive individuals. Allergic responses include hay fever-type symptoms, such as sneezing, runny nose, red eyes, and skin rash (dermatitis).

Furthermore, allergic reactions to mold are common. They can be immediate or delayed. Molds can also cause asthma attacks in people with asthma who are allergic to mold. In addition, mold exposure can irritate the eyes, skin, nose, throat, and lungs of both mold-allergic and non-allergic people.

According to ASHRAE (2012), long term moisture may result in:

- Shortening the life of building materials and furnishings which may affect the structural integrity of the building, leading to excess maintenance, repair and renovation costs
- Reduces the effectiveness of insulation leading to increased energy consumption
- Reducing the perceived value of a property and increasing the cist of its insurance coverage
- Reducing occupant satisfaction because unpleasant odors and musty smells
- Attract vermin and termites

Sources of moisture

Internal: respiration (an adult breaths out approximately 200 milliliters of water vapor per hour while awake and 20 milliliters per hour during sleep, producing around 3 liters of moisture per day), unflued gas heating, cooking, showering or bathing, clothes washing and drying

Construction moisture: concrete floor slabs, concrete masonry and walls, timber

External: leaks through the building envelope, subfloor moisture, leaking plumbing pipes and appliances, flood prone sites

(Branz, 2012)

Important points to remember:

- Adequate drainage under and around the home
- Concrete slab cured before the rest of the home is erected
- Stick frame housing – make sure it is not contaminated with the fungi (timber wrapped in plastic causes timber to sweat and can be the source of the problem)
- Appropriate waterproofing
- Damp proof course correctly installed and well maintained
- Using naturally hygroscopic building materials
- Do not place garden beds directly againts the house

(Bijlsma, 2012)

Paints/glues/other VOCs

These chemicals are typically found in high concentrations in a new home as a result of sealing floors, installing new carpets, painting and particle board. These VOCs can „out gas“ for many years. (Bijlsma, 2012)

Pesticides

Chemical based pesticides are associated with health risks. Consequently, non-chemical based pesticides are recommended when you are building. (Bijlsma, 2012)

Summary

What distinguishes the human being from the corpse is the fact that it's alive. But we are more than just alive. We're sentient beings: we feel. And our feelings seem to be affected by more things and last longer than those of animals. Dogs dont't seem to mind ugly surroundings. We do. Consequently, environment unavoidably affects our feeling life.

Building biology is all about this – supporting life. Even without scientific data, we can, to some extent, sense when a place is healthy and energizing and when it isnt't.

Just as our inner development steers and is steered by our biography, we shape and are shaped by our environment. This cyclical process is so indissolubly bound that, without concious action, we never step outside it to shape or be shaped differently. (Day, 2014)

It is this concious step that building biology is concerned with.

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