



*AMERICAN
PUBLIC
TRANSPORTATION
ASSOCIATION*

Designing for Wellbeing: Understanding VOI



A Culture of Health vs Pry, Poke, Punish

**PHYSICAL
ERGONOMICS**



**SOCIAL
/COLLABORATIVE**



**COGNITIVE
ERGONOMICS**



FROM WELLNESS TO WELLBEING

A photograph of a window with a view of a building. A small green plant is growing on the windowsill. The text '90%' is overlaid on the image in a large blue font.

90%

of our time is spent indoors.



90% of our time is spent indoors.

The Very Mortal Life of City Bus Drivers

The job has long been one of the most stressful and hazardous gigs in town.

ERIC JAFFE | [@e_jaffe](#) | Sep 5, 2012 | [8 Comments](#)

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Bus Drivers

Think your job is stressful? Try plowing 20 tons of glass and metal through snarled traffic, bike messengers, and jaywalkers.

By Rick DelVecchio



Her scrunched-up shoulders and urge to weep when she got to work told Christine Zook all she needed to know about her future as a bus driver.

The effects of stress on the body



Mood issues including anger, depression, irritability. Lack of energy, concentration problems, sleeping issues, headaches. Mental issues including anxiety disorders and panic attacks.



Increased blood pressure, increased heart rate, higher cholesterol and risk of heart attack



In the immune system, there is reduced ability to fight and recover from illness



Stomach cramps, reflux, and nausea



Loss of libido, lower sperm production for men, and increased period pain for women



Aches and pains in the joint and muscles



Lower bone density

In studies of heart attack patients under 40, bus drivers make up the highest represented profession.

BIOPHILIA

Healthy offices have a wide variety of plant species inside and out as well as views of nature from workspaces.



CULTURE OF HEALTH

Healthy offices have access to public transport, safe bike routes, parking, and showers, and a range of health food choices.



ACTIVE DESIGN

Healthy offices have a diverse array of workspaces, with ample meeting rooms, quiet zones, and stand-sit desks, promoting active movement within offices.



NOISE & ACOUSTICS

Healthy offices use materials that reduce noise and provide quiet spaces to work.



INDOOR AIR QUALITY & VENTILATION

Healthy offices have low concentrations of CO₂, VOCs and other pollutants, as well as high ventilation rates.



MATERIALITY

Healthy offices have colours, textures, and materials that are welcoming, calming and evoke nature.



DAYLIGHTING & LIGHTING

Healthy offices have generous access to daylight and self-controlled electrical lighting.



THERMAL COMFORT

Healthy offices have a comfortable temperature range which staff can control.

IAQ & Ventilation Thermal Comfort







IAQ & Ventilation

Low-Emitting Materials

Reduced VOC content

Increased Air Flow Rates

Operable Windows

Increased Filtration

Pollutant Source Control (copiers, **vehicles**, dust)

Building Location

Concentrations of some pollutants can be 2 – 5
times higher indoors compared to outdoors EPA 2012

8-11%

increase in productivity not uncommon as a result of better air quality

101%

increase in cognitive scores for workers in a green, well-ventilated office.

Daylighting









Daylighting

Skylights

Clerestories

Side Lighting

Tubular Daylight Devices

100% Daylit Spaces

Glare Control

Solar Shading

15%

Increase in focused work for window views

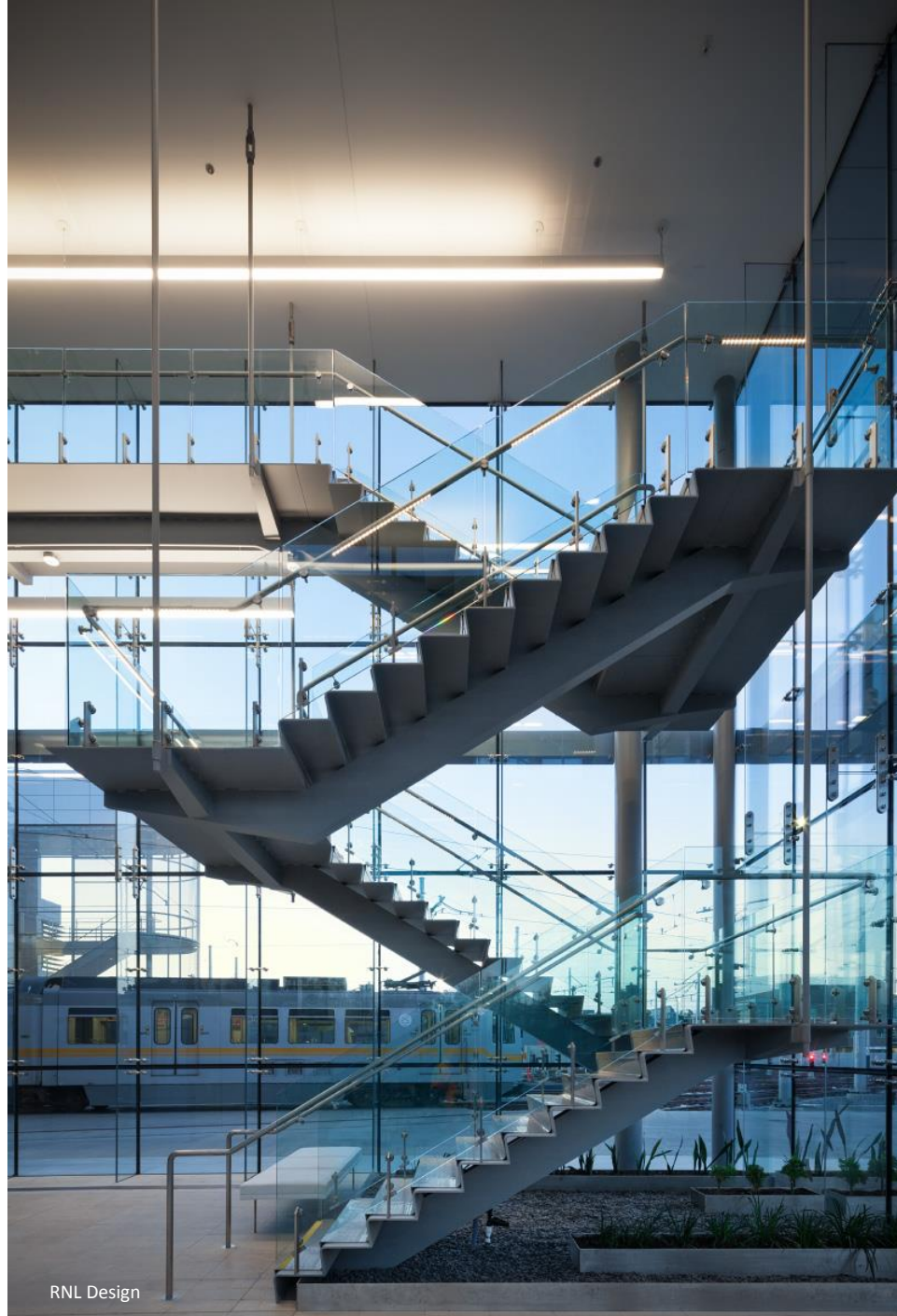
46mins

More Sleep for workers with windows

Lighting







Lighting

Lighting Controls

Occupancy vs Vacancy Sensors

Task Lighting

Color Temperature

Light Output

Zoning

Branding

Safety

Biological Body Clock Calibration

Mood

Alertness

Cognition

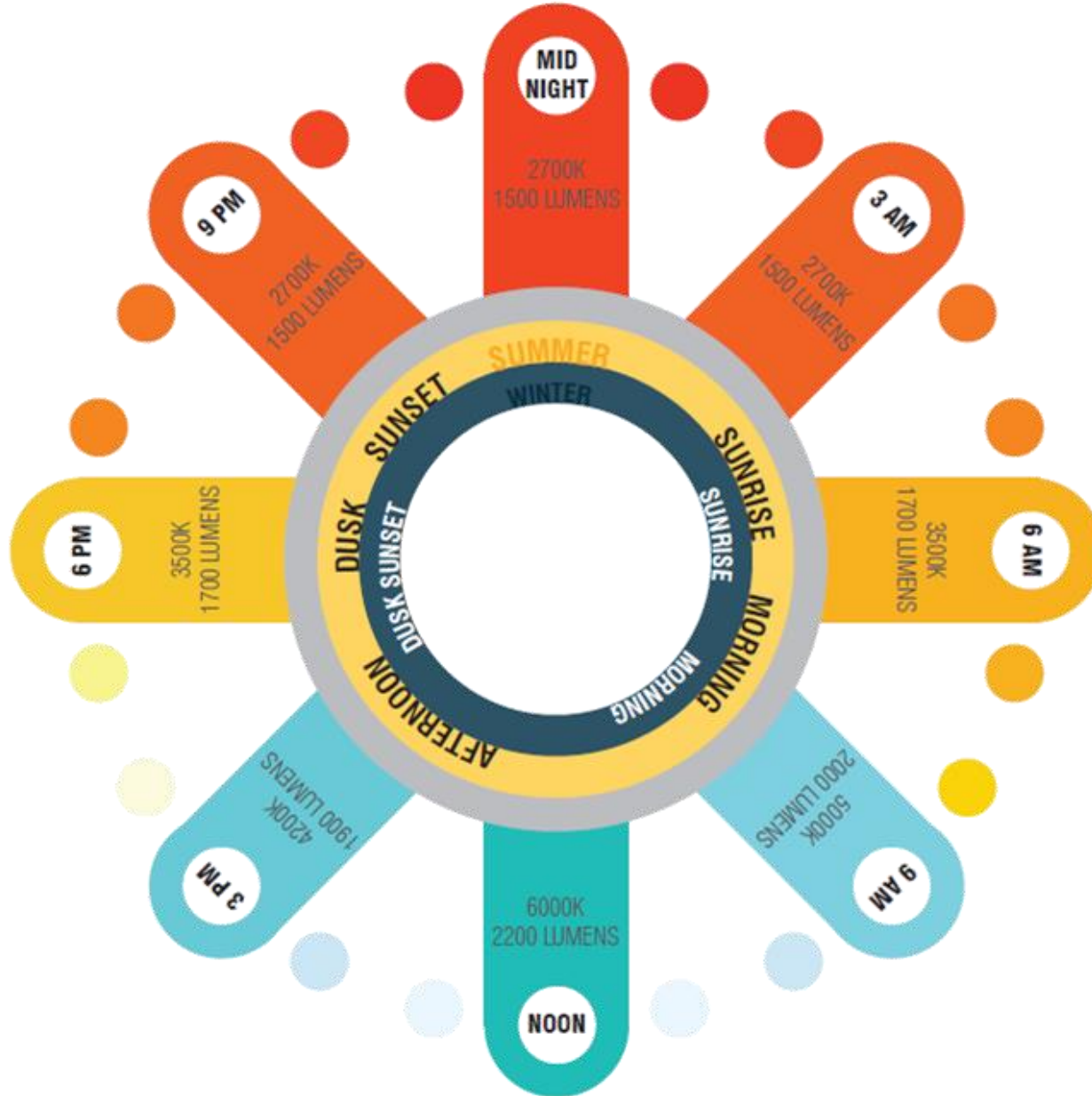


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Diabetes

Cancer

SPACE DESIGN ◦ LIGHTING



Biophilia



NO PARKING
FIRE HYDRANT



7-12%

Increase in processing time with a view of nature

6%

Increase in concentration with a view of a green roof
vs a conventional asphalt roof

Materiality



Metro Division 13
Bus Operations and Maintenance Facility



Metro

44

Materiality

Finishes

Furniture

Branding

Way-Finding

13%

Higher level of wellbeing for workers who work in environments with natural elements, such as greenery and sunlight

Culture of Health



한국교통공사
KORAIL
Korea
Railway
Corporation

자전거





27%

Lower risk of depression from greater fruit and vegetable intake

Bus drivers have the highest rate of depression of any profession per a 2014 study by Social Psychiatry and Psychiatric Epistemology

Culture of Inclusion (Equity by Design)



Metro

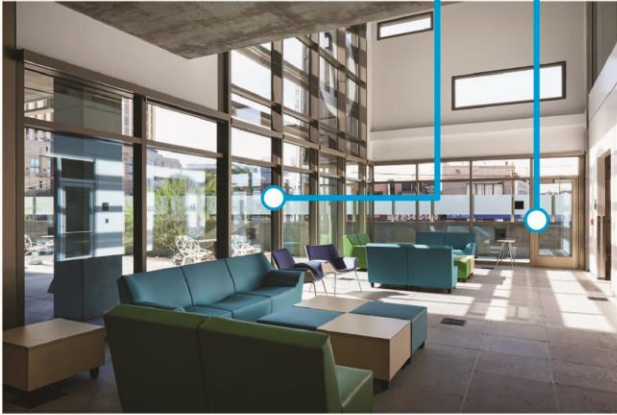




BIOPHILIA

7-12%

increase in processing time with a view of nature



CULTURE OF HEALTH

27%

lower risk of depression from increased fruit and vegetable consumption



ACTIVE DESIGN

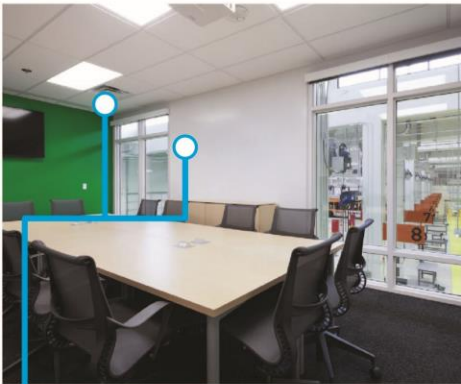
Signage and situational cues can increase stair use by

50%



NOISE & ACOUSTICS

66% decrease in performance from exposure to distracting noise



INDOOR AIR QUALITY & VENTILATION

8-11% increase in productivity from better air quality



MATERIALITY

Effective references to nature can be direct or indirect



DAYLIGHTING & LIGHTING

15% increase in focused work with window views



THERMAL COMFORT

4% reduction in performance at too cool temperatures, 6% at too warm



Thank You!

Barbara Berastegui
Associate Principal