Playing with light.

Olly Veugelers | 4166833 Architectural Engineering Design tutor | Ir. Annebregje Snijders Building Technology + Research tutor | Dr.-Ing. Marcel Bilow P5 | 29th of June 2018

Playing with light.

The relationship between daylight and sports hall designs in the Netherlands

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1.1 Alvar Aalto, Sports hall for the Helsinki University of Technology, Espoo, 1949-1952.

"No space, architecturally, is a space unless it has natural light."

- Louis Kahn













1.2 Pictures of the gym at my old elementary school, Sporthal de Lindenhof. - problem statement -

The design of **traditional sports halls** has tended to **exclude natural light**. Mostly due to problems such as glare, overheating and local cooling. Variation in light quality and quantity can be unmanageable and fenestration can lead to **unwelcome distractions**.

- problem statement -

The design of traditional sports halls has tended to exclude natural light. Mostly due to problems such as glare, overheating and local cooling. Variation in light quality and quantity can be unmanageable and fenestration can lead to unwelcome distractions.

However, the resulting designs are rarely compatible with attractive architecture and pleasing indoor environments.



lost connection

no relationship to seasons and weather



natural light

daylight is often excluded



artificial light

convenience of the use of artificial light



why do we mostly design secluded boxes in the Netherlands when it comes to sports facilities?



no regulation for sports hall designs in the Netherlands that specifies the daylight requirements



cost effectivity

sports halls with large proportions of windows have higher costs + additional requirement blinds



difficulty to achieve visual comfort with daylight in sports halls and hard to avoid glare

controlling light

- overall design question -

"How can the use of **daylight** be optimised within the design of an indoor environment with a **mixture of sports** at the Marine area of Amsterdam?" - thematic research question -

"How can the relationship between **daylight** and **sports hall designs** in the Netherlands be defined compared to other European countries, when the **CEN** (European Committee for Standardization) remains the guideline for sports lighting at European level?"

research

methodology analysis / case studies **conclusion**

From research to design



ems or strategies can be
part into sports halls?

What techniques and methods are used to *control/optimise the use of daylight in the*

What are important standards and *recommendations* that should be **included** in the **design** of a sports building?

Which <u>steps</u> have to be taken into account when designing a sports building?

> Which regulations do we have and which norms are conflicting?

From research to design





















From research to design



From research to design



From research to design



From research to design



From research to design





From research to design



From research to design



design

urban scale building scale daylight concept



context. marine area





Site

The Marineterrein is with its rich history and unique location an icon in the city, and well known spots such as **Nemo** and **the National Maritime museum** nearby



Accessibility

two new bridge connections to the **Dijksgracht (1)** and to **Oosterdok (2)** gives the area a completely different meaning in the context





Sports and to meet

One of the themes in the development of the marine area is to create sports and meeting places in the area

sports and to meet



Central meeting point

the open spot at the centre of the Marine area will become a central meeting point



location. marine area


strict border

The marine area is characterized with a strict boundary of land



creating inlets

Dissolve the edge + blur the sense of boundary of the land the marine area by **creating inlets in the strict boundary**



additional outdoor sports activities

Piers are created where **kayaks** can berth and **water sports** can take place.

DESIGN ORGANISATION OF THE PROGRAM



How do we organize a highly complex and diverse program within the Marine area?



To organize the various functions in relation to **specific requirements** and needs, the **complex program** of various **sports** is organized corresponding their **functionality**



active / public

skateboarding, outdoor basketball, streetdance, running, karate

active / indoor

indoor sports, badminton, basketball, volleyball, soccer, fencing, judo, gymnastics (education)

relax / retreat

yoga, pilates, swimming, fysio retreat, mediation, restaurant, cafe



the urban plaza

skateboarding, outdoor basketball, streetdance, running, karate

the active front

indoor sports, badminton, basketball, volleyball, soccer, fencing, judo, gymnastics (education)

the backyard

yoga, pilates, swimming, fysio retreat, mediation, restaurant, cafe







The building is divided in three main parts to give place to each function in relation to specific requirements and needs





The building is divided in three main parts to give place to each function in relation to specific requirements and needs



The building is divided in three main parts to give place to each function in relation to specific requirements and needs



The building is divided in three main parts to give place to each function in relation to specific requirements and needs



To give place to functions with the highest privacy range a new cluster is created in the core of the building





FUNCTIONS

Various functions are clustered by either active or relax to fit in the programme

active | fencing, judo, boxing



FUNCTIONS

Various functions are clustered by either active or relax to fit in the programme

active | indoor sports hall



CORE

Whereas the core gets less access to light, all the functions with the highest privacy range are positioned in the core, such as changing rooms, showers and toilets



DAYLIGHT

North-orientated sheds allows uniform daylight into the sports hall



SUNLIGHT

To avoid direct sunlight from the south a overhang will be created by extending the roof at the south facade

sunlight | overhang to avoid direct light from the south

S



DAYLIGHT PRINCIPLES

reflections can be avoided when glass is pushed inwards



DAYLIGHT PRINCIPLES

recessed or splayed windows let indirect light in without sharp contrasts



DAYLIGHT PRINCIPLES

To bring daylight in the core of the building a skylight will be added + the wall will be set back



climbing wall



CLIMBING WALL

Inclined wall will be used for bouldering and climbing activities



design

DIFFERENT HEIGHTS IN RELATION TO PROGRAM

three volumes are created for the various sports



CONNECTION TO SURROUNDINGS

the three volumes are turned into a friendly and more elegant form by making a wavy roof





INTERIOR

continuously, this has been continued in the interior to evenly distribute the light in the space



FROM RESEARCH TOWARDS DESIGN

the design principles from my research show how light can be integrated into the design of a sports building on the basis of certain strategies

DESIGN IN RELATION TO THE CONTEXT






























FIRST FLOOR



FIRST FLOOR







•

















2				









construction climate concept details

CONSTRUCTION PRINCIPLES

integration of construction within the design

• CROSS LAMINATED TIMBER BEAMS

The great width (>40 m) of the suspended roof is spanned by cross laminated timber beams (CLT)



integration of construction within the design



CONSTRUCTION PRINCIPLES

integration of construction within the design



• FRONT - Y COLUMNS

94 | 120

south

SOUTH FACADE













⇒+ 15.0m	
⇒+13.0m	
⇒+8.0m	
⇒+7.0m	
VIII	
	97 120





+ 15.0m	
+ 13.0m	
⇒+ 8.0m	
⇒+7.0m	





DETAILS

integration of climate within the design











Ø







DETAIL 1.2 | integration air ducts







outer roof



inner roof









CONSTRUCTION NODE


THE MAIN INDOOR SPORTS HALL



THE MAIN INDOOR SPORTS HALL



THE SOUTH FACADE



















Playing with light

The intecture of daylight and sports The relationship between daylight and sports hall designs in the Netherlands

Presentation of:

Tutors:

As part of:

Date:

CLIMATE PRINCIPLES

integration of climate within the design



integration of climate within the design

