

BACKGROUND

architectural design concept

Filipinos have the reputation of supporting fellow Filipinos who represent the Philippines in different fields especially in sports like basketball, volleyball, and soccer which are usually covered by mainstream media. Until recently when Filipino athletes bagged medals and gained recognition in the Tokyo 2020 Olympics, the masses started to become aware of different sports that swerve from the mainstream media, and broke gender norms established in sports. Along with this is the rise of Esports in the country where video games are now being seen as something that is more than just a hobby but an actual sport. Just like our athletes, the country's Esports athletes have also proven that they are at par with international teams as Team Secret competed in last year's (2021) Valorant Champions.

With this, a differently calibrated sports facility would aid in supporting and training athletes who have been receiving less attention from both the government and the masses. This project would provide a space where sports such as weightlifting, skating, and Esports could collaborate, and would also allow enthusiasts of these sports enjoy and also train in the facility.

lighting design concept

With the project having a combination of physical sports facilities and esports facilities, a mix of daylighting and artificial lighting strategies will be utilized.

The physical sports facilities (indoor skate spot, weightlifting room), daylighting will be used more by having open areas and large windows to give a more spacious and free environment for the users. This also allows for comfortable and ample natural lighting to provide ease and safety as the users move around these areas.

Esports facilities on the other hand would use more artificial lighting in order to give a virtual feeling and by using RGB LED Lights might help in producing this feeling. Minimal daylighting will be used for these facilities as to avoid having unwanted glare on the screen monitors, but enough room and spaces where daylighting is used to provide adequate comfort and relaxation for the users' eyes.

daylighting strategies

skylighting with diffusers.

Skylighting will be used mainly for areas where there is high activity and movement to provide sufficient lighting without having to use much artificial lighting to reduce the energy consumption of the building.

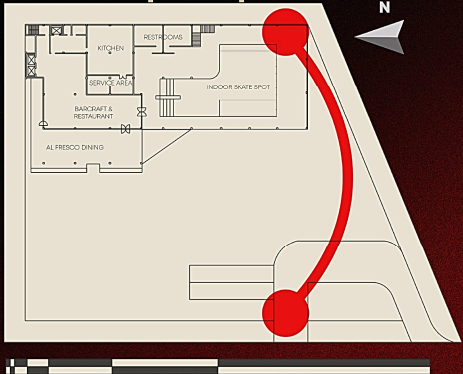
overhangs.

Overhangs will be added for the bar/craft and restaurant where artificial lighting is provided.

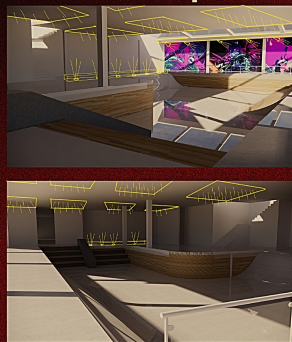
floor to ceiling windows with glazing.

By having glazed floor to ceiling windows will provide ample daylighting for the weightlifting room and upper corridors and at the same time reducing the discomfort from the excessive heat that might penetrate the windows.

site development plan



indoor skate spot

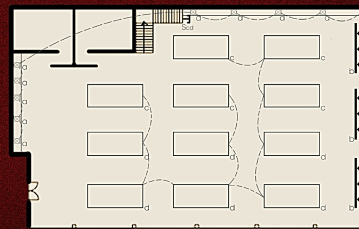


In sports and recreational facilities, ample lighting is important especially for indoor facilities, as to not limit the activities during the daytime and allow the users to extend their use until dark.

For the project's indoor skating park, minimal artificial lighting is needed during the day as most of the space is illuminated by daylighting.

Artificial lighting is used more during nighttime to provide enough illumination for safe skating. Ceiling panels will be used as the main lighting source. Recessed uplights, and spotlights are placed along the walls to give the space a little bit of character and to highlight the murals.

LIGHTING LAYOUT



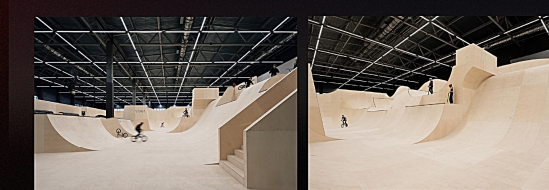
INDOOR SKATE SPOT CEILING PLAN



illumination standards & requirements

recommended lighting levels

IESNA		CIBSE	
Gymnasium - Exercise & Workout	200-300 lux	Sports Hall - Club	500 lux
Gymnasium - Sports & Games	300-500 lux	Sports Hall - Recreational	200 lux



URAM Indoor Extreme Park, Kazan, Russia by KOSMOS Architects, Legato Sports Architecture

lighting specifications

ambient lighting	general lighting	ambient lighting
GreenSpace Accent Projector mini ST312 LED3V8 840PSU F183 WH Number of light sources: 1 Beam angle of light source: 120 deg. Optic type: Wide beam Initial luminous flux (system flux): 3900 lm Luminous flux tolerance: +/-10% Initial LED luminaire efficacy: 193 lm/W Init. Corr. Color Temperature: 4000 K Initial Color Rendering Index: >= 80 Initial input power: 31.5 W	SlimBlend Rectangular, recessed RC400B LED368 830SRD W30120VPCIA4PIPS Beam angle of light source: 120 deg. Light source color: 830 warm white Optic type: - Initial luminous flux (system flux): 3600 lm Luminous flux tolerance: +/-10% Initial LED luminaire efficacy: 111 lm/W Init. Corr. Color Temperature: 3000 K Initial Color Rendering Index: >= 80 Initial input power: 32.5 W	Denali - Recessed Uplight Surface LED x68 Beam angle of light source: 60 deg. Light source color: 830 warm white Optic type: Wide flood Initial luminous flux (system flux): 1470 lm Init. Corr. Color Temperature: 3000 K Initial Color Rendering Index: >= 90 Initial input power: 27W

COMPUTATION & ANALYSIS

calculations

GIVEN	CAVITY RATIOS	EFFECTIVE REFLECTANCES	NUMBER OF LUMINAIRES
SlimBlend Rectangular, 3600 lumens (LED) E = 500 lux A1 (wall area) = 489.60 m ² A2 (floor area) = 915.38 m ² Floor Perimeter = 108.80 m Height = 4.50 m hcc = 0.00 m hfc = 2.00 m (recessed part of skate spot) hrc = 4.50 m pcc = 80% pw = 75% pf = 20%	$RCR = \frac{2.5 (A1) - 2.5 (489.60)}{A2} = \frac{1.34}{915.38} = \mathbf{1.34}$ $CCR = RCR (hcc) = \frac{1.34 (0)}{4.5} = \mathbf{0}$ $FCR = RCR (hfc) = \frac{1.34 (2.00)}{4.5} = \mathbf{0.60}$ LIGHT LOSS FACTOR LLD = 0.80, LDD = 0.74, BF = 1.0 $LLF = LLD \times LDD \times BF = 0.80 \times 0.74 \times 1 = \mathbf{0.59}$	pcc = 80%; pw = 75%; CCR = 0 pcc = 0.78 or 78% pf = 20%; pw = 75%; FCR = 0.60 pcc = 0.195 or 19.5%	$N = \frac{(E \times A)}{n \times LL \times LLF \times CU}$ $= \frac{(500) (915.38)}{(1) (0.60) (0.59) (0.96)}$ N = 224.5 or 225 SPACING = 0.4m
		COEFFICIENT OF UTILIZATION pw = 75%; pcc = 78%; pf = 19.5%; RCR = 1.34 CU = 0.96 or 96%	

analysis & summary

It is important for sports and recreational areas to be well-lit so that their activities would not be hindered by the lack of visibility brought by insufficient lighting.

As the surroundings of the site are highly urbanized, limited daylighting is available. The daylighting of the area can be improved by strategically locating the skylights or by incorporating a sawtooth roof instead for a more distributed daylighting. However, it must be kept in mind that enough sunshading devices are used in order to lessen the heat that the users may experience.

By comparing the final computed required number of luminaires and the conceptual lighting layout, there is a huge difference in the number of lighting fixtures as the total area of the space was not initially taken into consideration. The number of fixtures can be lessened by using a fixture with a higher luminous flux. Another solution might be that instead of using recessed general lighting, low-bay lighting fixtures can be used instead to create a greater ceiling cavity and a smaller room cavity.

Other than the general lighting, secondary lighting fixtures can be added to give the space some character, and these may also serve as visual directional guides (eg. lighting under the bleachers, and along the edges of the recessed part of the skate spot). By doing so, it would make the space more visually appealing and would provide more safety to the users.



Undercroft Skatepark, London