<!-- Slide number: 1 -->
# KURSUS REKABENTUK PEMASANGAN ELEKTRIK VOLTAN RENDAH (LANJUTAN)27 & 28 Julai 2021
Ir. Siti Nor Binti Hassan
JEPK UPRBA2
CKE IBU PEJABAT

<!-- Slide number: 2 -->
# Spesifikasi CKE
Sehingga Julai 2021 terdapat 41 bilangan Spesifikasi CKE (L-S1 hingga L-S41)
Terdapat 20 bilangan Spesifikasi CKE tersenarai dalam J-Pedia iaitu L-S1, L-S2, L-S3, L-S4, L-S5, L-S6, L-S9, L-S10, L-S11, L-S12, L-S13, L-S14, L-S15, L-S17, L-S20, L-S26, L-S29, L-S30, L-S31 & L-S32
Manakala terdapat 21 bilangan Spesifikasi CKE masih dalam pembangunan/ pengemaskinian iaitu L-S7, L-S8, L-S16, L-S18, L-S19, L-S21, L-S22, L-S23,     L-S24, L-S25, L-S27, L-S28, L-S33, L-S34, L-S35, L-S36, L-S37, L-S38, L-S39, L-S40 & L-S41

<!-- Slide number: 3 -->
# SENARAI Spesifikasi CKE
Dalam J-Pedia

| Bil | L-S | Specification For |
| --- | --- | --- |
| 1 | 1 | Low Voltage Internal Electrical Installation |
| 2 | 2 | Low Voltage Automatic Power Factor Correction Equipment |
| 3 | 3 | Low Voltage Underground Cable |
| 4 | 4 | Low Voltage Overhead Line Distribution System |
| 5 | 5 | Three Phase Generator Set |
| 6 | 6 | Acoustic Treatment For Generator Room |
| 7 | 9 | Lightning Protection System For Structures |

<!-- Slide number: 4 -->
# SENARAI Spesifikasi CKE
Dalam J-Pedia

| Bil | L-S | Specification For |
| --- | --- | --- |
| 8 | 10 | 11kV Distribution Transformers |
| 9 | 11 | 11kV Medium Voltage Oil Circuit Breaker |
| 10 | 12 | 11kV High Voltage Ring-Main Unit Distribution Switchgear |
| 11 | 13 | 11kV High Voltage Underground Cable |
| 12 | 14 | 11kV SF6 Ring Main Unit |
| 13 | 15 | 11kV Metal-Enclosed Switchgear |
| 14 | 17 | 11kV Dry-Type Distribution Transformer |

<!-- Slide number: 5 -->
# SENARAI Spesifikasi CKE
Dalam J-Pedia

| Bil | L-S | Specification For |
| --- | --- | --- |
| 15 | 20 | Road Lighting Installation |
| 16 | 26 | Satellite Master Antenna Television (SMATV) & Master Antenna Television (MATV) System |
| 17 | 29 | Electronic Access Control System |
| 18 | 30 | Queue Management System |
| 19 | 31 | Stage Curtain System |
| 20 | 32 | Visual System |

<!-- Slide number: 6 -->
# SENARAI Spesifikasi CKE
Dalam pembangunan/pengemaskinian Jawatankuasa

| Bil | L-S | Specification For |
| --- | --- | --- |
| 1 | 7 | Single Phase Diesel Generator Set |
| 2 | 8 | Lightning Protection System (Using Stranded G.I. Wires) |
| 3 | 16 | Telephone Installation |
| 4 | 18 | Uninterruptible Power Supply (UPS) |
| 5 | 19 | Traffic Signal |
| 6 | 21 | Diagnostic Imaging Equipment (Medical Equipment) |
| 7 | 22 | Operation Theatre Table (Medical Equipment) |

<!-- Slide number: 7 -->
# SENARAI Spesifikasi CKE
Dalam pembangunan/pengemaskinian Jawatankuasa

| Bil | L-S | Specification For |
| --- | --- | --- |
| 8 | 23 | Surgical Light (Medical Equipment) |
| 9 | 24 | 60 Hz Frequency Converter |
| 10 | 25 | Three Phase 400 Hz Frequency Converter |
| 11 | 27 | Public Address (PA) System |
| 12 | 28 | Aeronautical Ground Lighting System (AGL) |
| 13 | 33 | Sound Reinforcement System |
| 14 | 34 | Conference System |

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# SENARAI Spesifikasi CKE
Dalam pembangunan/pengemaskinian Jawatankuasa

| Bil | L-S | Specification For |
| --- | --- | --- |
| 15 | 35 | Navigation Light |
| 16 | 36 | Nurse Call System |
| 17 | 37 | Helipad |
| 18 | 38 | ICT Networking System |
| 19 | 39 | Closed Circuit Television (CCTV) System  |
| 20 | 40 | Fireman Intercom System |
| 21 | 41 | Three Phase Canopy Genset |

<!-- Slide number: 9 -->
# Rekabentuk Terkini
Keperluan TNB terkini iaitu Ogos 2019 dalam Esah v3.1
LVCT Ground Mounted TNB Meter Kiosk
Direct Meter Board (Hardwood)
Meter Panel (Group Metering)
Keperluan bilik meter setiap aras jika kuarters (high rise) melebihi ≥6 tingkat
Keperluan Feeder Pillar selepas LVCT Ground Mounted TNB Meter Kiosk ATAU
Keperluan Pre MSB (sebelah PE TNB)

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# Rekabentuk Terkini
Penggunaan Kelengkapan Lampu LED :
External Lighting
Lampu Kawasan/Jalan, Lampu Pagar, Lampu Papan Tanda, Lampu Façade, LED Bulkhead
Internal Lighting
T8 LED, LED Downlight, High/Low Bay LED Luminaire

<!-- Slide number: 11 -->
# Kriteria penting
Internal Lighting – T8 LED
Self-Ballasted Double Capped LED Lamp
Barang Kawalan Suruhanjaya Tenaga
Correlated Colour Temperature, CCT
4000K
5000K
Safety Photobiological Class : Exempt Group
≤ 11W / ≤ 20W
≥ 840 lm  / ≥ 1400 lm
≥ 70 lm/W  /    ≥ 80 lm/W
Pasang SPD pada DB Lighting

<!-- Slide number: 12 -->
# Kriteria penting
Internal Lighting – LED Downlight
Diameter : 150mm / 200mm
Mild Steel
CCT : 4000K, 5000K
Frosted Tampered Glass
Safety Photobiological Class : Exempt Group
≤ 20W
≥ 850 lm (4000K) / ≥ 950 lm (5000K)
≥ 75 lm/W (4000K) /  ≥ 75 lm/W (5000K)
Pasang SPD pada DB Lighting

<!-- Slide number: 13 -->
# Kriteria penting
External Lighting – LED
CCT : 3000K
CCT : 5000K/6500K untuk Lampu Papan Tanda/ Facade
≥ 100 lm/W
IP 54
Mesti pasang SPD  dalam Service Door

<!-- Slide number: 14 -->
# Kaedah Pengiraan bilangan lampu LED (INTERNAL)
Menggunakan Software DIALux
Mesti ada IES files dari Supplier/Manufacturer

<!-- Slide number: 15 -->
# Kaedah Pengiraan bilangan lampu LED (EXTERNAL)
Menggunakan Software DIALux
Merujuk kepada Table 3 dan 5 dalam CIE 115 (Lighting of Roads For Motor And Pedestrian Traffic)
Perlu ada pengetahuan untuk menyemak keputusan simulasi DIALux

<!-- Slide number: 16 -->
# Kaedah Pengiraan bilangan lampu LED (SPOrts court)
Rujuk BS EN 12193 (Light and Lighting : Sports Lighting) / Garis Panduan Dan Peraturan Bagi Perancangan Bangunan Edisi Tahun 2015 / FIFA
Menggunakan Software DIALux
Perlu ada pengetahuan untuk menyemak keputusan simulasi DIALux

<!-- Slide number: 17 -->
# Reka bentuk instant water heater point
Wajib patuh kepada PPE 1994 Peraturan 36
Mengadakan 25A DP RCCB (10mA)
Pendawaian dari 63A DP RCCB (100mA) i.e lighting circuit
Menggunakan 25A Connection Unit (Dahulu 15A 3 pin SSO)

<!-- Slide number: 18 -->
# Beban Mekanikal
Jadual untuk Motor Fire Fighting System
Jadual untuk Motor Sistem Air Condition
15 A 3 Pin sso untuk Air Cond ≤ 2.5hp / 1865W
≥ 2.5hp please select the suitable rating of SPN Isolator

<!-- Slide number: 19 -->
# POWER FACTOR CORRECTION BOARD
Kaedah untuk mendapatkan Step 1
Unit untuk AC-6b contactor adalah dalam kVAR
FAT PFCB
Setting ck ratio
Set Circular mode
Set Switching Sequence seperti yang direka bentuk
1:1:1:1:1:1 …
1:1:2:2:2:2 …
1:1:2:2:4:4 …
1:2:2:2:2:2 …
1:2:4:4:4:4 …
1:2:4:8:8:8 …

<!-- Slide number: 20 -->
# Earthing untuk peralatan ict
IEC 30129 : Information technology — Telecommunications bonding networks for buildings and other structures
Akan rujuk L-S38 : Specification For ICT Networking System
Telecommunication Bonding Conductor (TBC)
Primary Bonding Bar (PBB) in Server Room or Main TCR

<!-- Slide number: 21 -->
# Earthing
Tukar Main Equipotential Bonding kepada Main Protective Bonding pada Gambarajah Pendawaian Skematik MSB

<!-- Slide number: 22 -->
# Nilai bacaan earth electrode resistance test
R for MSB < 3Ω
R for landed quarters <10Ω
R for high rise quarters <3Ω
R for N-E Standby Gen-Set < 20Ω
R for LPS < 10Ω
R for N-E Transformer <3Ω
R for N-E Transformer <3Ω
R for Telephone System <1Ω (Jika diminta oleh TMB)

<!-- Slide number: 23 -->
# Lightning Protection System
25mm x 3mm Aluminium Tape as a Air Termination System
Site – ONLY non coastal area
Bimetallic Testing Joint (Al/Cu)
Dari Bimetallic Testing Joint ke Earth Chamber mesti guna 25mm x 3mm Copper Tape

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Anda tanya, saya tolong jawab

<!-- Slide number: 25 -->
Terima KAsih