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*Electric Energy Distribution Network
Analysis Program
(PADEE)*

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www.padeepro.com/padeeing.html

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WHO IS MATMOR?

MATMOR Engineering is form in 1998 with more than 40 years engineering staff experience in Electric Energy Distribution Projects, Transmission and Substations. All these experience was and continuous used in developing PADEE software

MATMOR also do electric Works inspection and minor construction projects.

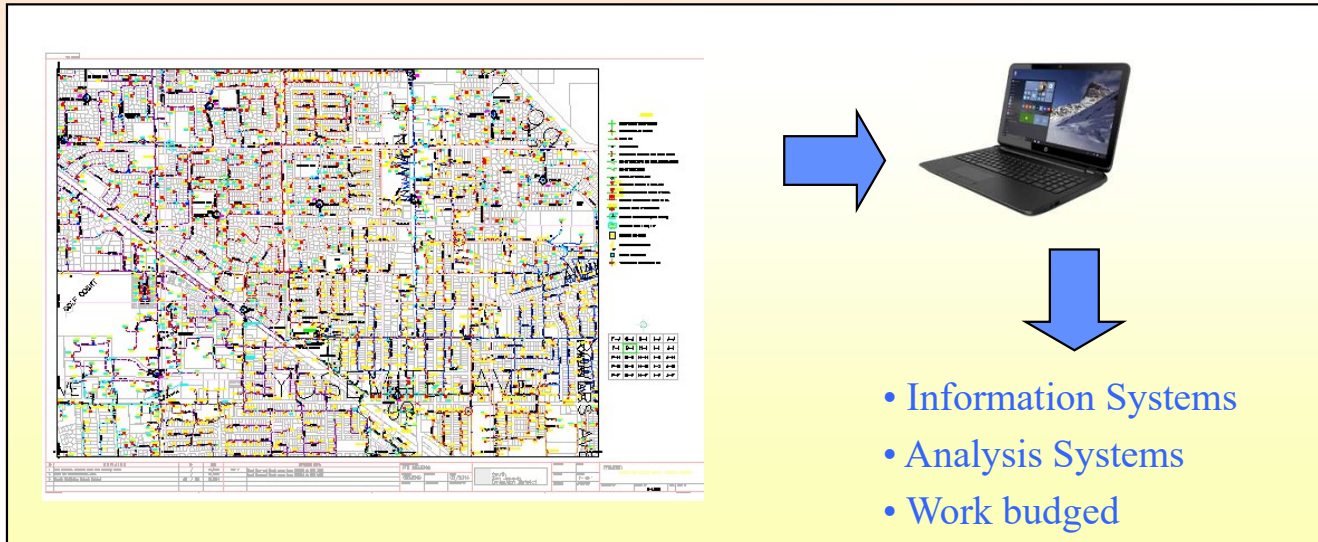
It also helps clients budgeting, buying and reception electric power equipment, computer hardware and software.

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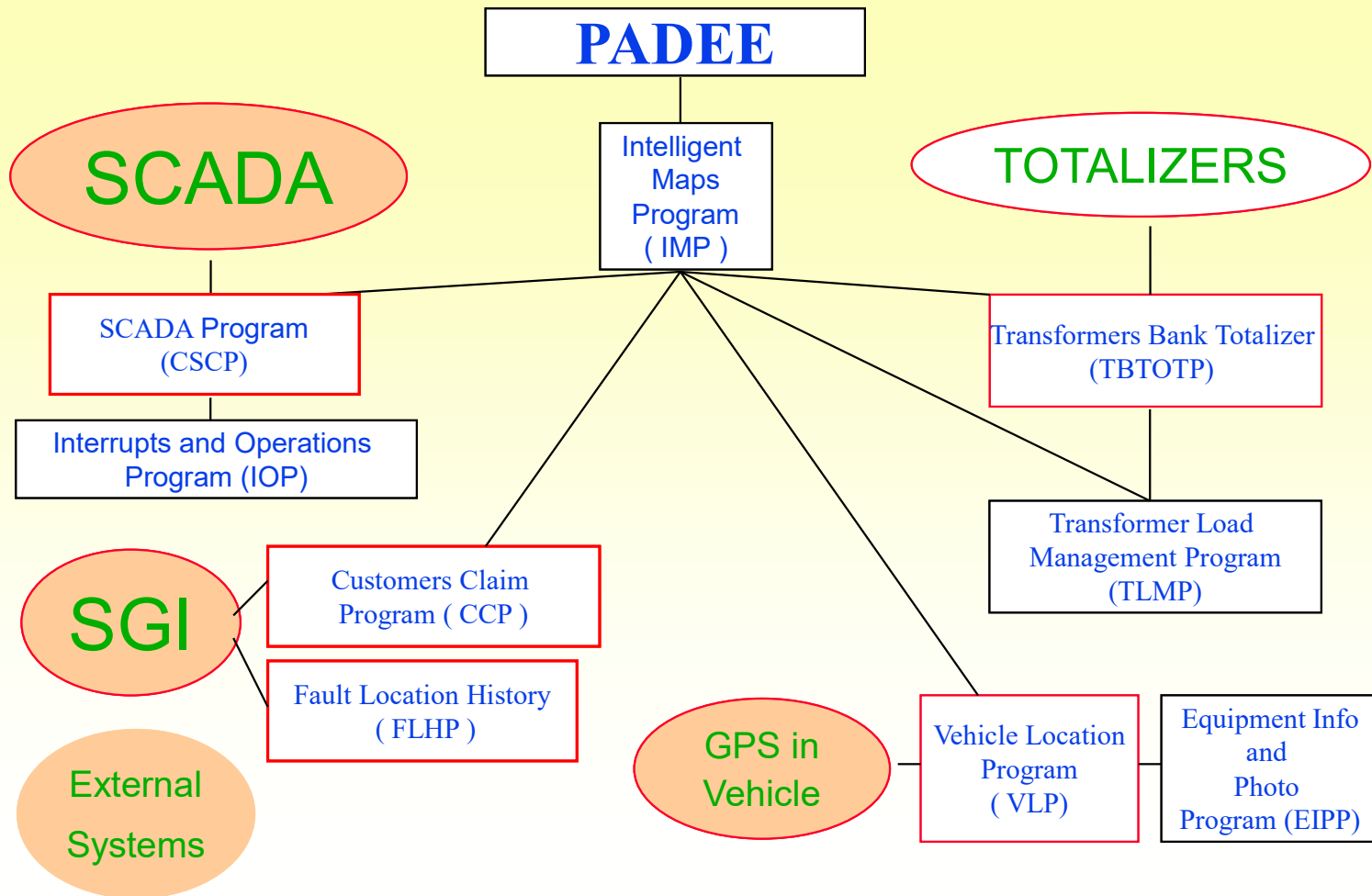
ELECTRIC ENERGY DISTRIBUTION NETWORK ANALYSIS PROGRAM (PADEE)

PADEE is a group of tools in CAD, CAE & GIS to perform all calculations and load flow analysis inside the distribution network maps environment. It also strongly support construction works executions, and customers offices tasks.

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Electric Energy Distribution Network Analysis Program (PADEE) modules



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PADEE Highlights

- Covers and integrates Planning, Operation, Projects, Commercial and Maintenance areas with a unique and coherent data base easy to visualize
- Use simple methodologies.
- Computer Hardware requirement is low.
- Quick Learning curve
- More than 300 seats in use
- Easy to buy for consulting companies and public utilities companies due to Flex Licenses opportunities

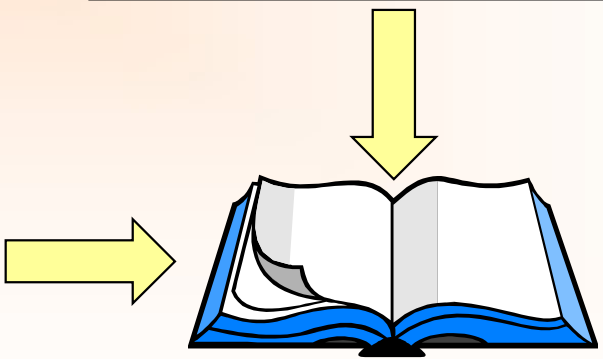
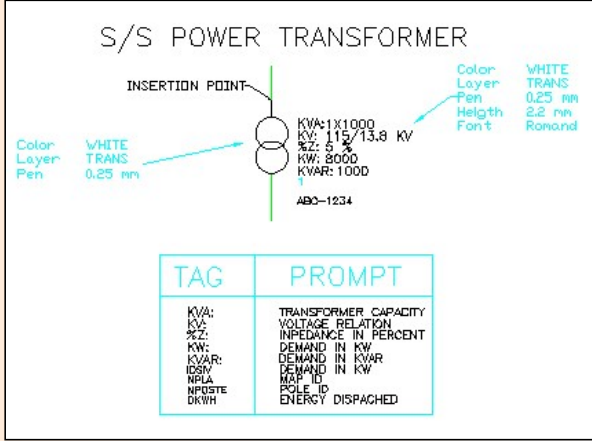
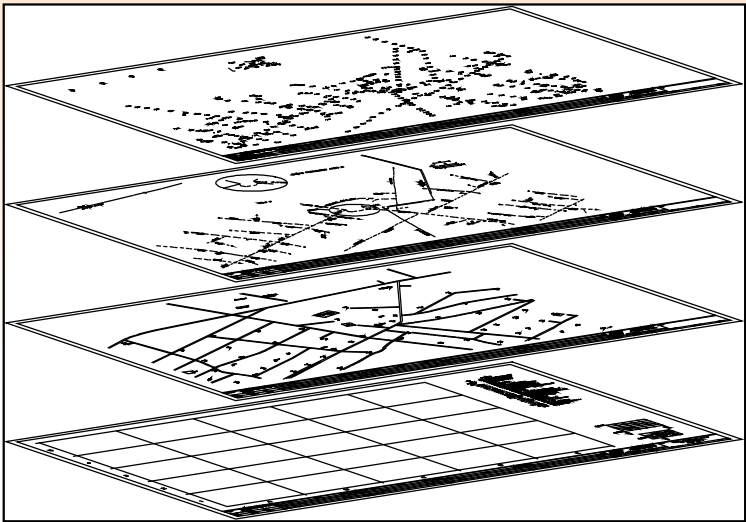
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Intelligent Map Design Program (IMP)

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It use Autocad drawing engine to make network maps easy to draw, share and maintain with a very fast learning curve

Take advantage of AutoCAD's layers and symbols



Intelligent Maps Program (IMP)

• The information neededs, to make all kind of analysis, is available in networks maps and these maps are already inside the computer (Autocad drawing), PADEE take advantage of this drawings and use the computer to extract the distance, loads, capacities and other data available in the map and transfer into the analysis programs automatically and transparent to Users.

•Maps Type

- Streets and parcels
- Electric Network
- Equipment Locations
- One Line Diagrams and schematics drawings

•This programs use the same visual symbols we had use for many years and but it may be customize to local drawing standards

•Layers and Blocks to makes maps

•Drawing Procedures to make intelligent maps

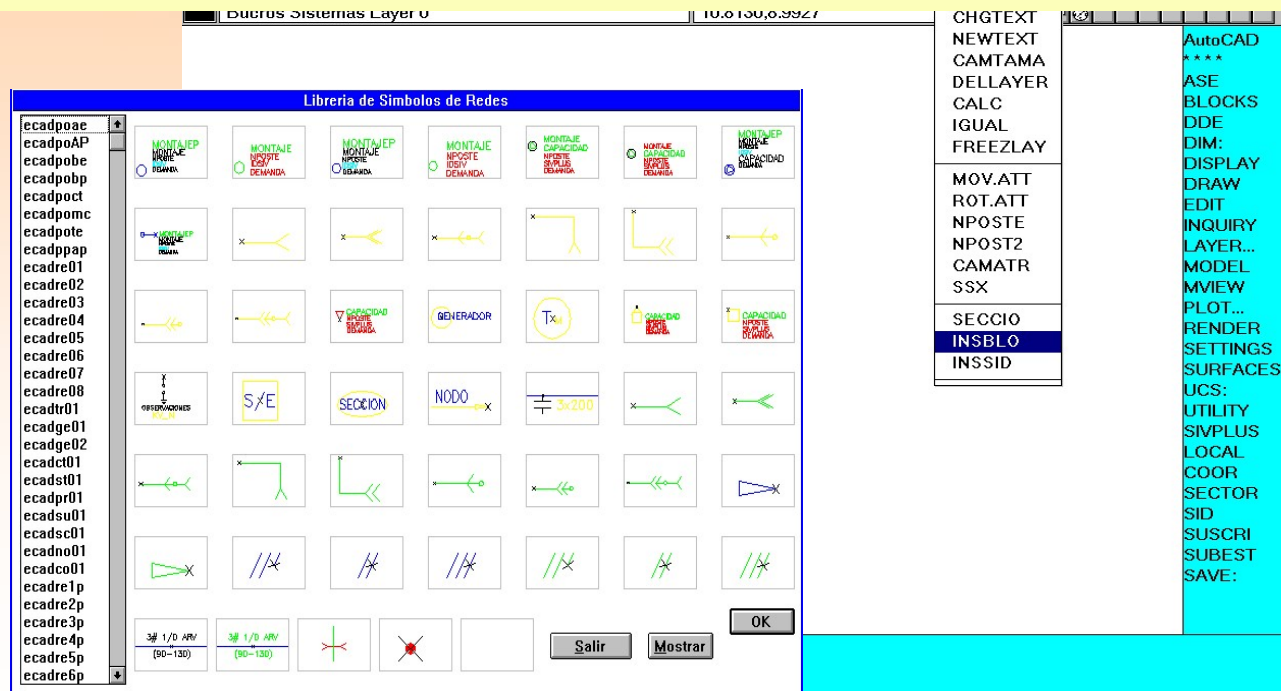
- Distances, Conductor Sizes, R y X
- Transformers Capacities, switches, cut-outs and other equipments

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Program and Symbols Selection using Menus

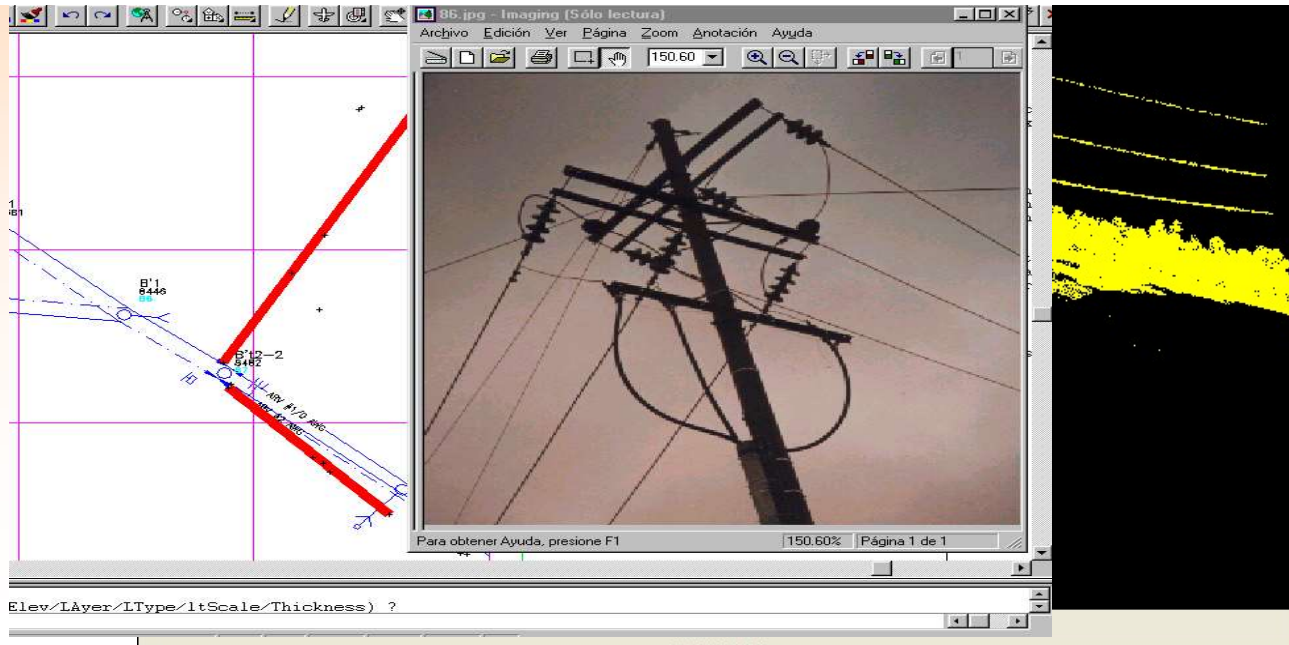
PADEE programs are called and loaded using “pulldown menus” or icons toolbars. Symbols are selected graphically from specials libraries menus

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Equipment Information and Photo (EIPP)

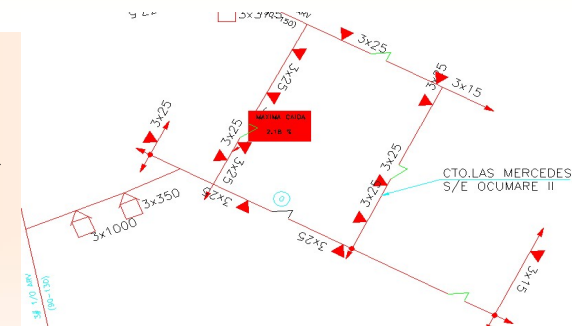
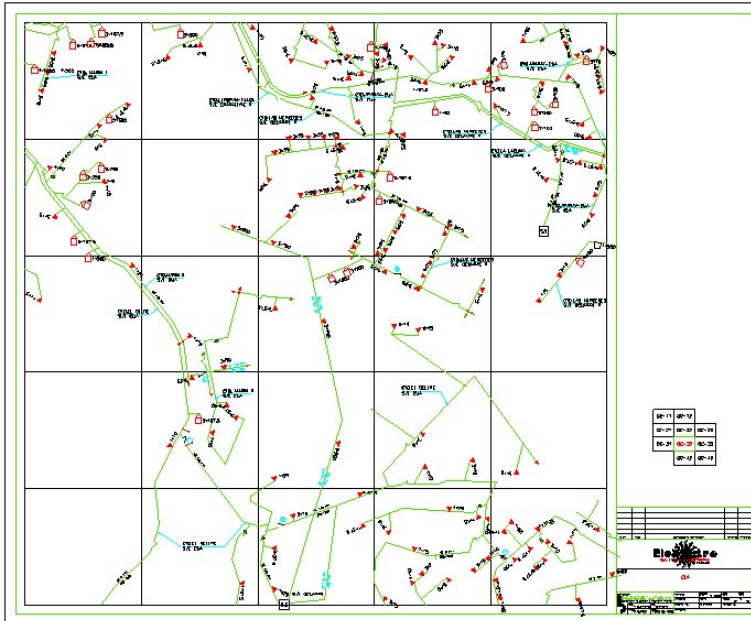
- Equipments in maps are linked to image, Excell Data, movie, or any other kind of multimedia documents. As example, pole may be photograph and linked to the network map.
- With this program you may click the symbol in map and it will deploy the information



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Primary Network Analysis Programs (PNAP)

- All analysis are inside the maps. PNAP results are graphics. It use "Flags" or colors to highlight problems at points or sections. Tabular results is just for detailing results and are similar to older programs.



CERRAL - GUAYAMA AÑO - 1987 ALTERNATIVA - 1 FECHA - 21.07.87 HOJA - 13.12

PROGRAMA DE SOLECCION DE OBRAS

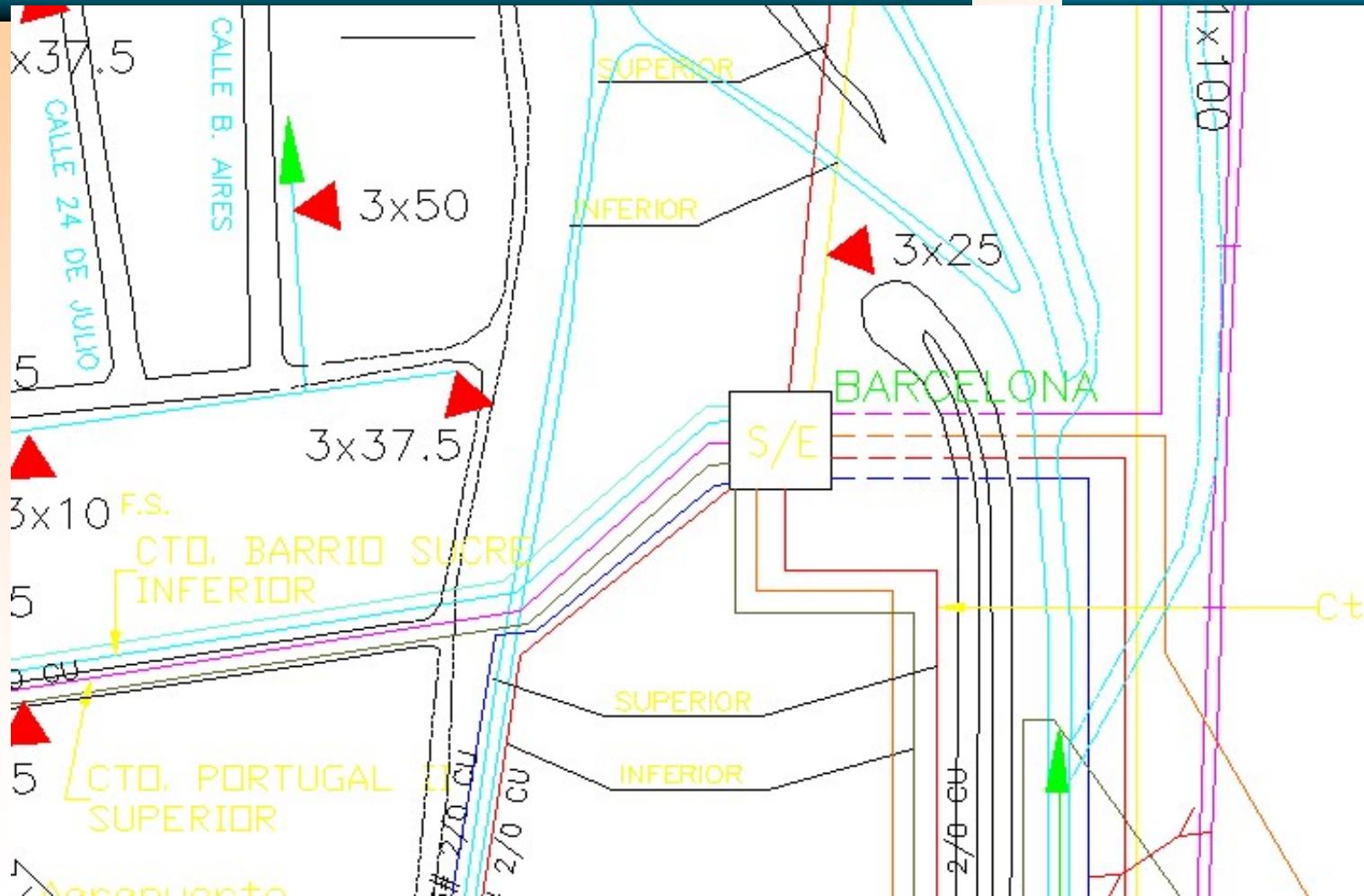
ALIMENTADOR NO. 3 CTO 43 CARRERA 233 S/E OCUMARE
VOLTAJE LINEA LINEA 15.00 KV
PUNTO DE INYECTA 80.00 A
SECCION DE LA RAMA 105 A
AMPERIOS POR FASE 139 134 135 84P

MODO	CONECTADOR	SERVIDOR LOCALIZACION			CARRAS PROFUNDAS			SERVIDOR PROFUNDAS		
		PVA	KV	AVAR	PVA	KV	PVA	KV	PVA	
23	00	00	00	00	00	00	00	00	00	00
17	70.00	49.53	29.70	29.42	00	00	00	00	00	00
2	00	00	00	00	00	00	00	00	00	00
12	1750.00	930.88	784.50	932.88	00	00	00	00	00	00
10	00	00	00	00	00	00	00	00	00	00
13	400.00	297.19	219.20	177.12	00	00	00	00	00	00
2	00	00	00	00	00	00	00	00	00	00
24	00	00	00	00	00	00	00	00	00	00
19	00	00	00	00	00	00	00	00	00	00
22	74.00	49.53	29.70	29.42	00	00	00	00	00	00
03	00	00	00	00	00	00	00	00	00	00
19	00	00	00	00	00	00	00	00	00	00
10	00	00	00	00	00	00	00	00	00	00
21	74.00	49.53	29.70	29.42	00	00	00	00	00	00
8	00	00	00	00	00	00	00	00	00	00
7	1810.00	483.48	585.80	618.78	00	00	00	00	00	00
14	3000.00	1583.18	1159.20	1418.63	00	00	00	00	00	00
4	00	00	00	00	00	00	00	00	00	00
16	400.00	289.18	218.20	177.12	00	00	00	00	00	00
1	00	00	00	00	00	00	00	00	00	00
5	400.00	289.18	218.20	177.12	00	00	00	00	00	00
TOTALES	7270.00	4324.64	3430.91	2873.14	00	00	00	00	00	00

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Primary Network Analysis Programs
(PNAP) – Automatically Feeder COLORED

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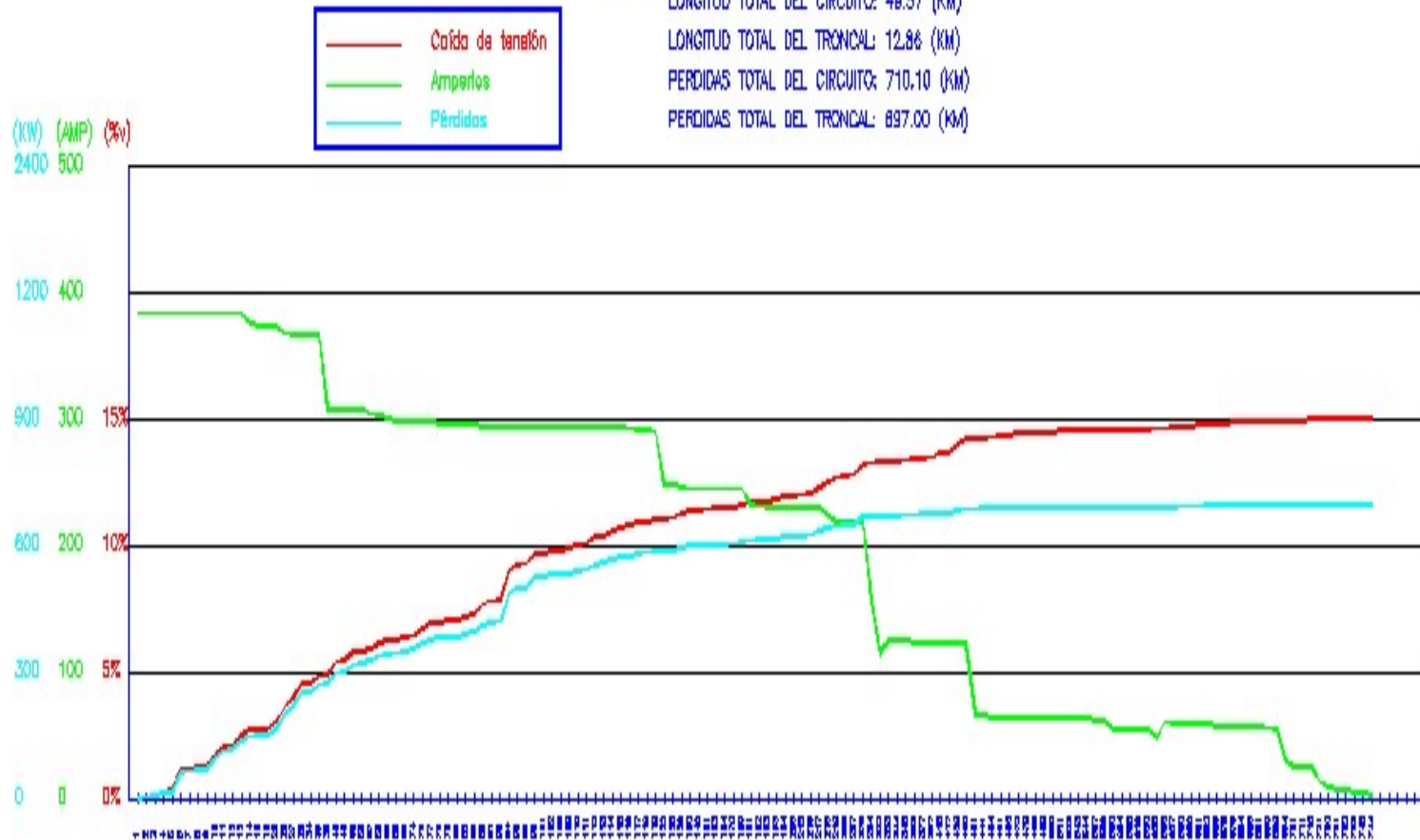


Primary Network Analysis Programs (PNAP) – Other Graphical Results

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CIRCUITO: 1 Canal I PTA. DEL ESTE

LONGITUD TOTAL DEL CIRCUITO: 48.57 (KM)
LONGITUD TOTAL DEL TRONCAL: 12.88 (KM)
PERDIDAS TOTAL DEL CIRCUITO: 710.10 (KW)
PERDIDAS TOTAL DEL TRONCAL: 897.00 (KW)



Primary Network Analysis Programs (PNAP)

The following analysis may be performed:

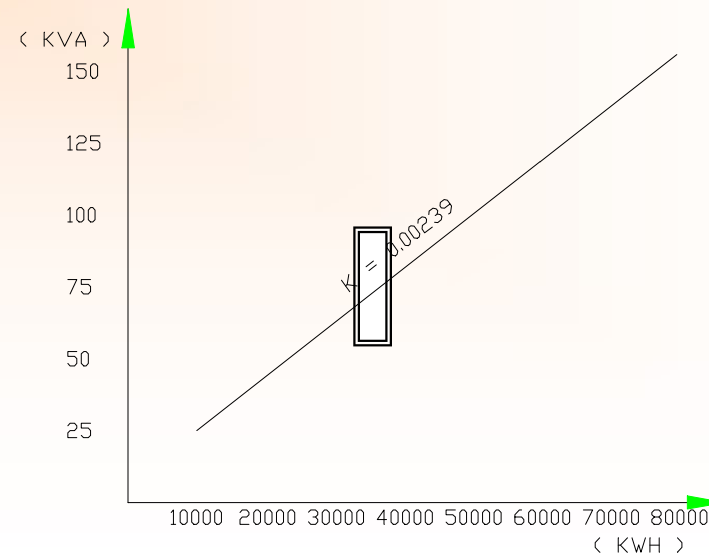
- Load Flow and profiles graphics results (voltage, loads, losses in each feeder sections and summaries)
- Capacitor Locations by minimum loss or minimum voltage drop criteria.
- Short Circuit calculation, three phase, two phases, two phase to ground and single phase to ground.
- Substation placing by load center criteria.

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Transformer Load Management Program (TLMP)

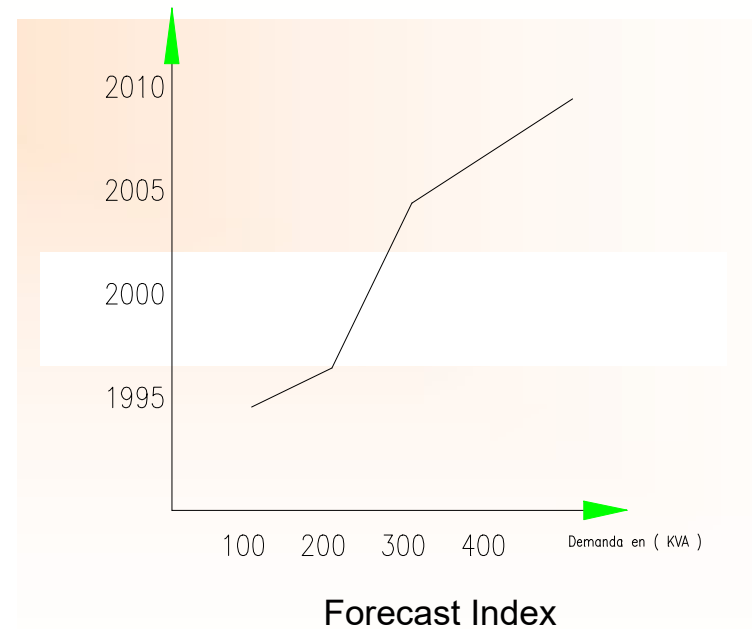
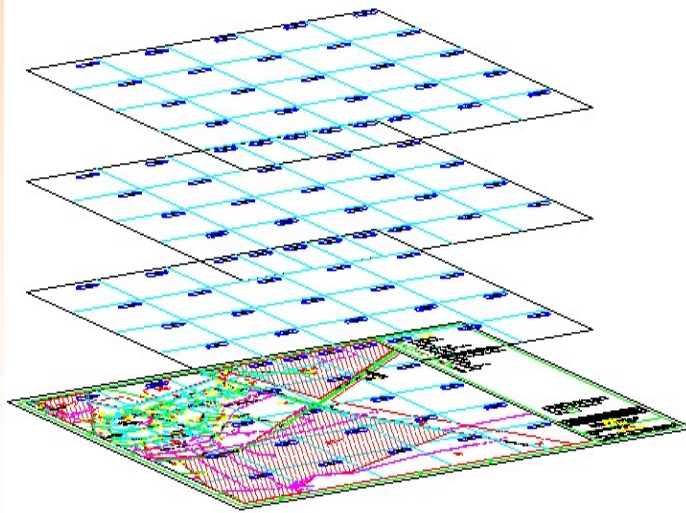
TLMP obtain transformer loads from low voltage networks, it use the relation made by SNAP and CP to get energy use by consumers. It sum all the energy used by consumers and use factor "K" to get transformer bank total demand. It may reverse the analysis with a instant measure to get estimate energy dispatch by transformer bank, and estimated non technical losses

Trafo N° Pole N°	Capacity (KVA)	Total Energy Montly	Load Total (KVA)	% Load (KVA)	Notes
AA-2405	3x25	54500	81.75	109	Overloaded
AA-2507	3x37.5	67890	101.83	90.51	
AA-2609	3x15	43203	64.8	144.01	Overloaded
AA-3610	3x25	50134	75.2	100.26	
AA-4555	3x75	60233	90.34	40.15	
AA-5523	3x15	32304	48.45	107.66	Overloaded
AA-1233	2x10	12330	18.49	92.47	
AA-2345	3x25	67002	100.5	134	Overloaded
BA-2344	3x25	60453	90.67	120.9	Overloaded
BA-1223	3x25	32435	48.65	64.87	
BA-2344	3x15	54623	81.93	182.07	Overloaded
BA-6734	3x50	32478	47.71	32.48	Underloaded
BA-2345	3x25	57567	86.35	191.89	Overloaded



Demand Forecast Program (DFC)

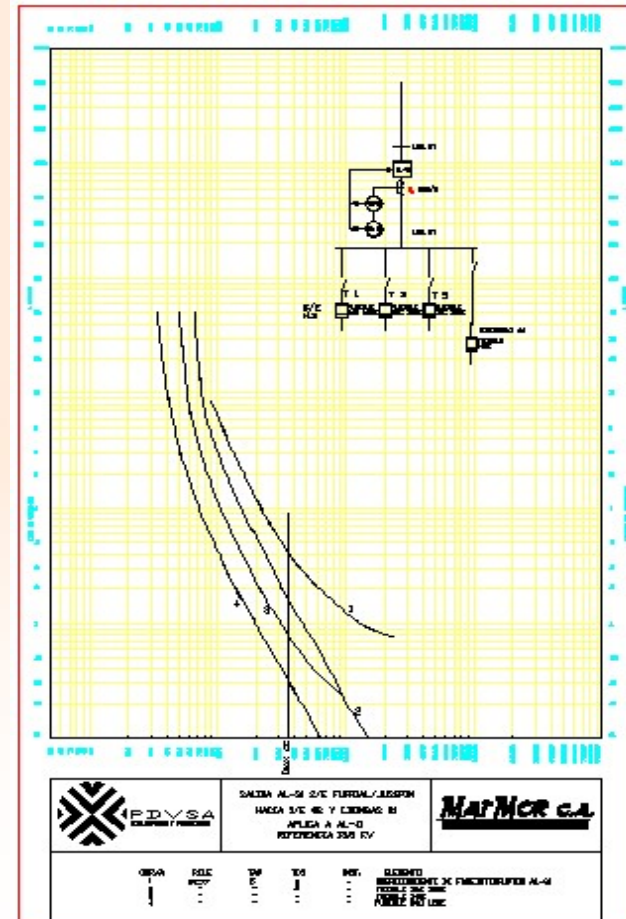
DFC make easy the hard work needed to input the land use data base. It also help to correlate present demand with estimated demands in small areas. May produce small area demand history.



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Programas de Coordinación de Protecciones (PCP)

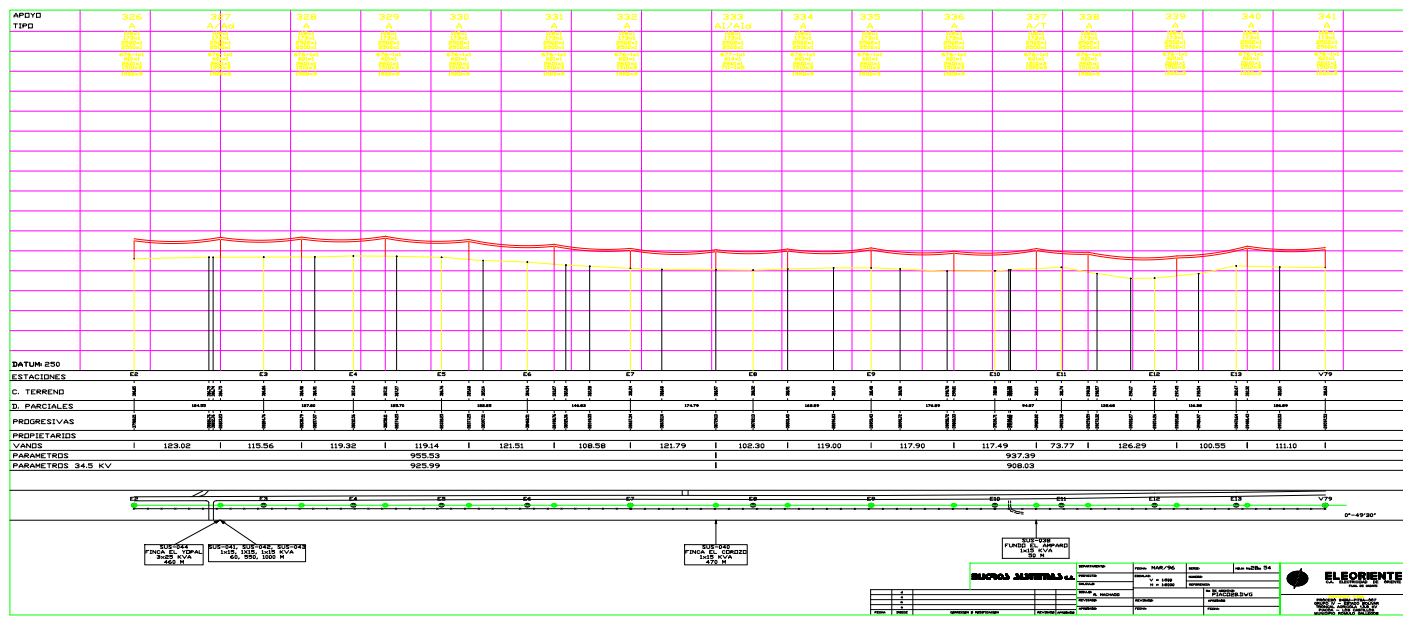
- Has more than 150 relay type and fuse curves
- Symbols Library to aid one-line diagrams
- Curve, CT Dial and TAPS Data Automatic Identification



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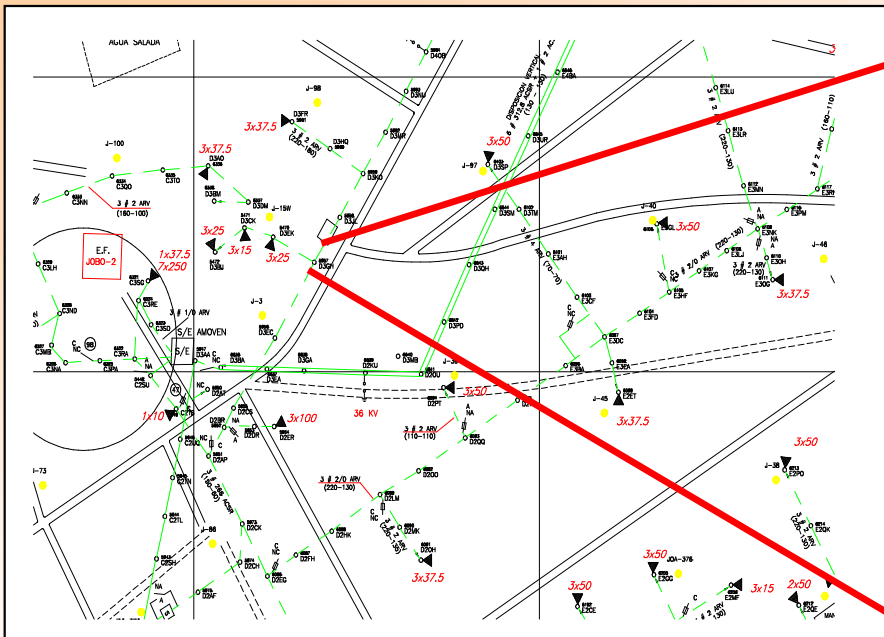
Programas de Perfiles Topográficos y Diseño de Líneas (PPTDL)

- Take data directly form Topographic Survey Notebook
- Do the mathematics
- Draw the topographic profile
- It has the tools with catenaries curves to manual pole placing.
- Calculates the exact catenary's conductors curve with the placed supporting structures or poles. Calculates medium span. Weight span and real parameter, and other.



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COMWIN PROGRAM (B.O.M. - WORK BUDGED)



E L E C T R O C I E N T E
UNIDAD DE DESARROLLO
FILIAL DE CADAFE

PUNTO: 1300 ESAPA: 0
DESCRIPCION: 21-0430
COD. OBRA: TUMEREM OBRA: REMODELACION DE LAS REDES AREAS DE DISTRIBUCION DE TUMEREM- ESTADO BOLIVAR.

PAGINA # 1
FECHA: 02/04/94

UNIDADES POR PUNTO

COD	DESCRIPCION	CAN	PRECIOS UNITARIOS (Bs)		TOTAL GENERAL
			MATER	M. OBRA	
101	POSTE RIGIDIZADO DE ACERO 09' R.125 HTS (27'3" DE LONGITUD) S-C. 15A KV	1.00	9951.00	703.00	10654.00
130	FUNDACION PARA POSTE DE 8.25 HTS . EN ALMEDIACION PARA CUALQUIER TIPO DE SUELO	1.00	2303.70	370.42	2674.12
2501	PINTURA DE POSTE DE BAJA TENSION CON SUJ. ACCESORIOS.	1.00	83.51	222.00	305.51
2502	CONDICIONACION DE POSTE	1.00	0.00	0.00	0.00
416	PERFORA DE CUATRO AISLADORES PARA ALIMENTACION MONOFASA EN POSTE DE SECCION 8.25 KV EN 4" X 3" (2") DE DIAMETRO.	1.00	1283.00	411.00	1694.00
301	BRASO DE A.P. DE 3/4" X 1.20 HTS ABRAZ. 3" X 1/2" (1" G) - 8.25 KV DE UNY. CON SU CONEXION AL POSTE LUMINARIA H-220.	1.00	1965.00	267.00	2232.00
2401	ADAPTADORES PARA CONEXION DE ACCESORIA DE BAJA TENSION RED MONOFASICA.	1.00	378.00	203.00	581.00

MONTO ACUMULADO (Bs) : MATERIALES 15964.21
MAJO DE OBRA 2170.62
TOTAL GENERAL 18140.63

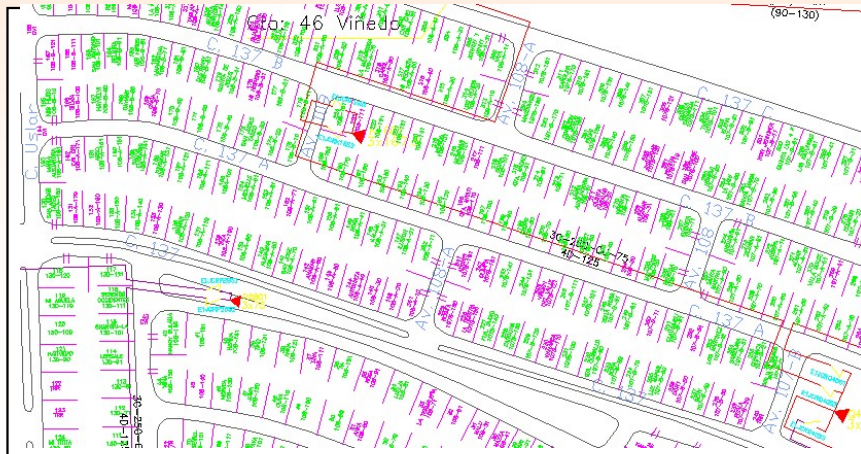
- Produce the Bill of Materials
- Work construction units
- Work Budgeted and other reports
- Can run stand alone o work with autocad maps.

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Energy Losses Program

No technical Losses (ELP)

- Distribute dispatched energy proportional to transformer bank demand
- Compare Dispatched Energy Vs Billed Energy
 - By small area (square area)
 - By Feeder
 - By distribution transformer
 - By Large areas
- Permit visual comparison of energy consumption between houses with similar characteristics

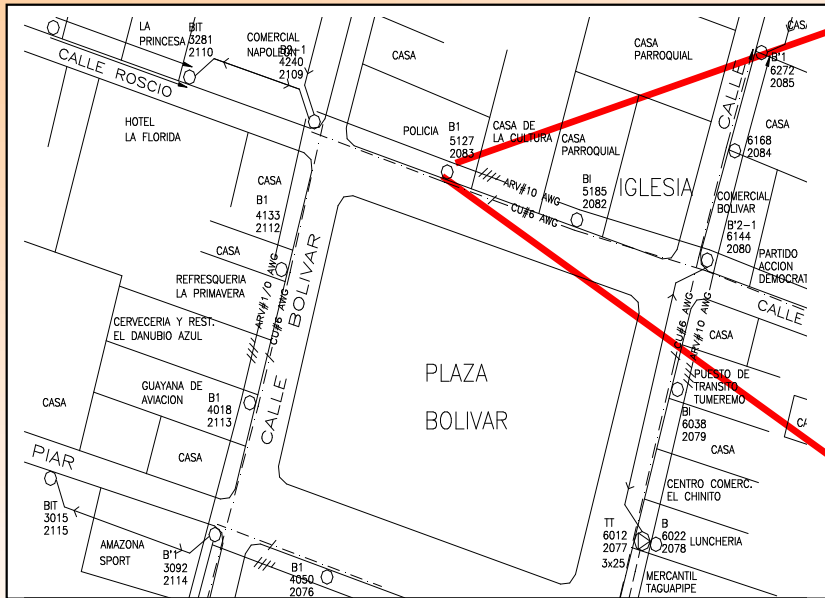


- Green Parcels are consumers with more than 500 kWh monthly, the rest are billing less. This are subjected to proper inspection.

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Inventory, Street Light and other service Program (NILOP)

MATMOR C.A.
INGENIERIA Y CONSTRUCCION
PADEE



PRESENTACION INVENTARIO

POLE GEO. ID: 11A4515 POLE CON ID: 73

TYPE	MATERIAL	USE	STATUS	SIZE	USE
POSTE	HIERRO	E	BUENO		

CROSS ARMS

NUMERO	TIPO	TAMAÑO	USO	ESTADO	NUM.	KVA	SERIAL
0					0		

TRANSF.

CANT.	ESPIGA	EST. ESPIGA	EST. PALILLO	CANT. SUSPENS	EST. SUSPENSION	NUM.	AMP	FUSIBLE
0			0	0		0		

INSULATORS

CUT-OUTS

NUM. PERCHA	EST. PERCHA	Num. AISLADORES	NUMERO	TIPO	NUMERO	TIPO
0			0		0	

PERCH

WIRE & ANCHORS

EQUIPMENT

NUMERO	TIPO	NUMERO	NUM. BALANTES	EST. CONEX. A POSTE	NUM.	TIPO	ESTADO
0		0	0		0		

SERVICE DROP

EARTHIG

ARRESTERS

STREET LIGHT

VOLTAJE	TIPO	ESTADO	EST. CAJA CONT.	VARIOS	LOCALIDAD
120	Plana	Buena		100	CARDENA

COUNTY/CITY

Observacion:

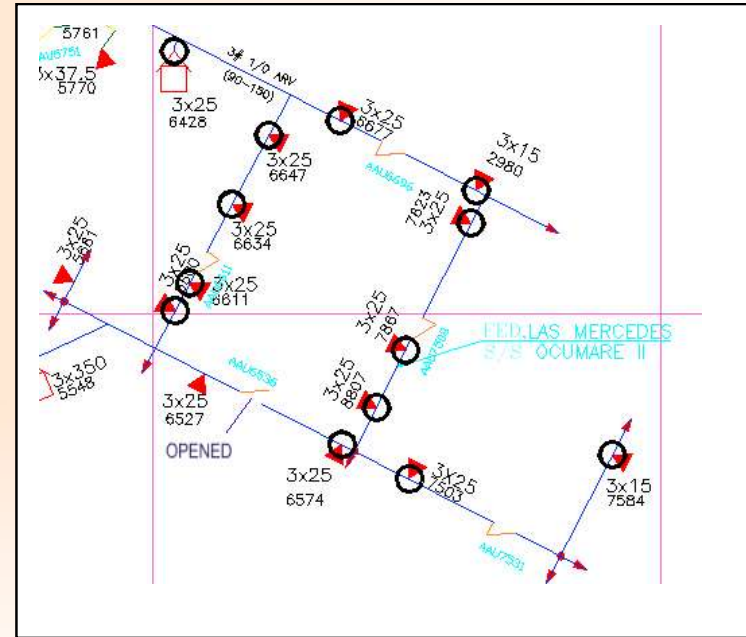
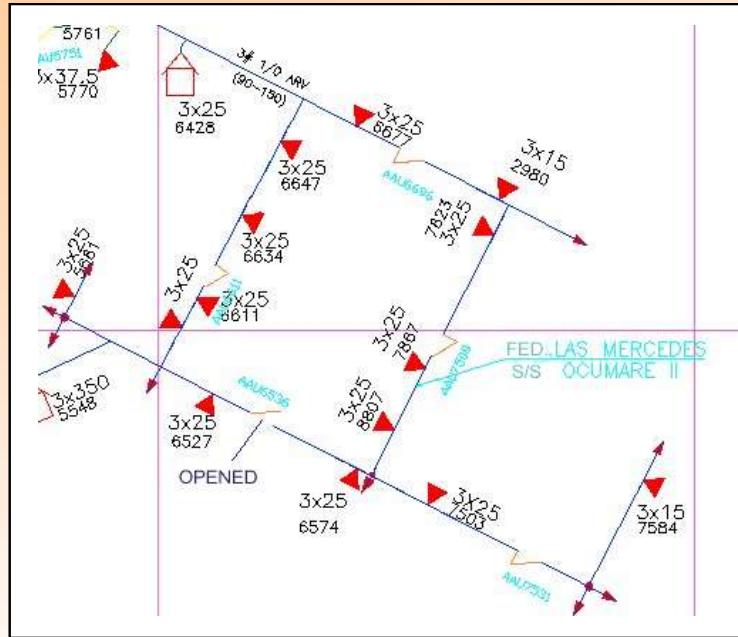
START END NEXT BACK EDIT ADD ELIM EXIT



- Directly form autocad map or stand alone
- Pole by Pole inventory and auditing
- Materials and equipment in bad shape
- Street Light auditing
- Pole rent to support other public service like, phone, Cable TV, and others

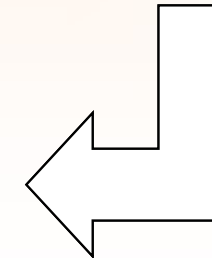
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Interruptions and Operations Programs (IOP)



AFFECTED CUSTOMERS

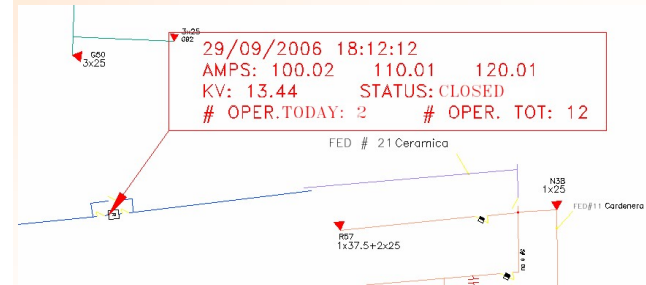
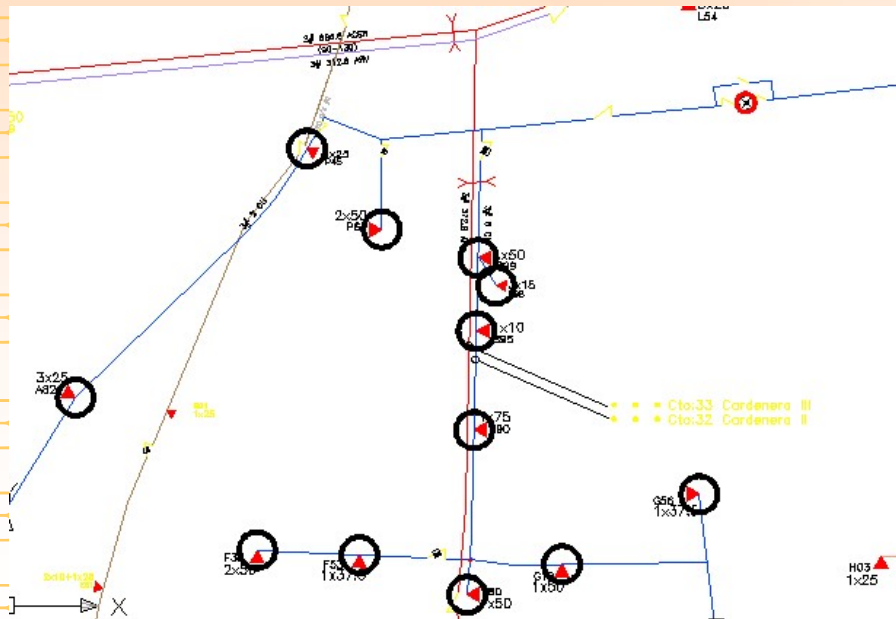
ACCOUNT	NAME / ADDRESS	ENERGY	POLE ID	METER/SATUS
60300120	CARMEN N. MENDOZA DE MARTINE	93.00	66	805137
	C. SUCRE No. 35	9.00		M
		9.00		
		0.00		
		37.00		
20135180	GOMEZ L. SERAPIO	186.00	66	161
	C. CARABOBO N 37	243.00		
		230.00		
		0.00		
		219.67		
60300090	PRIETO DOMINGO	408.00	67	2734547
	C. SUCRE No. 40	111.00		B
		1902.00		
		0.00		
		807.00		



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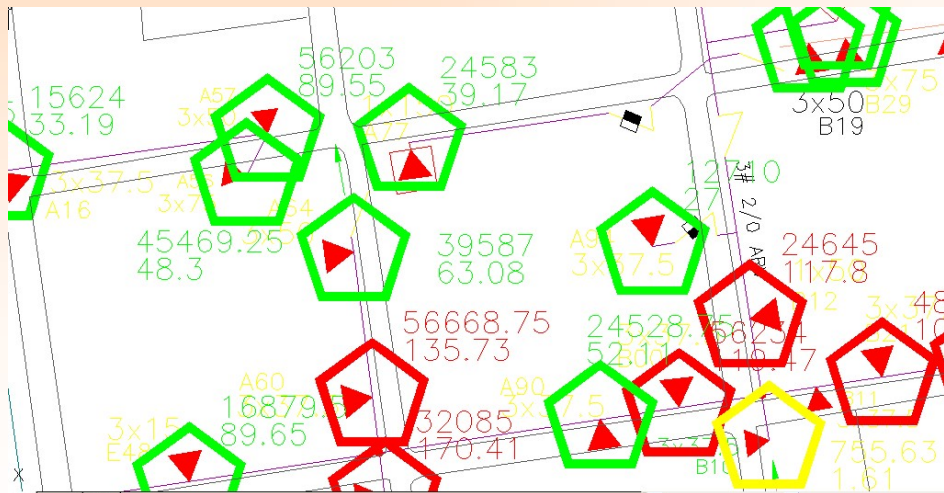
Scada Interface Programs (SIP)

- The interface “shoot” events into the network map, to visualize automatic switching events
- Visualize Status from automatic switching device.



Transformer Bank Totalize Program (TBTOTP)

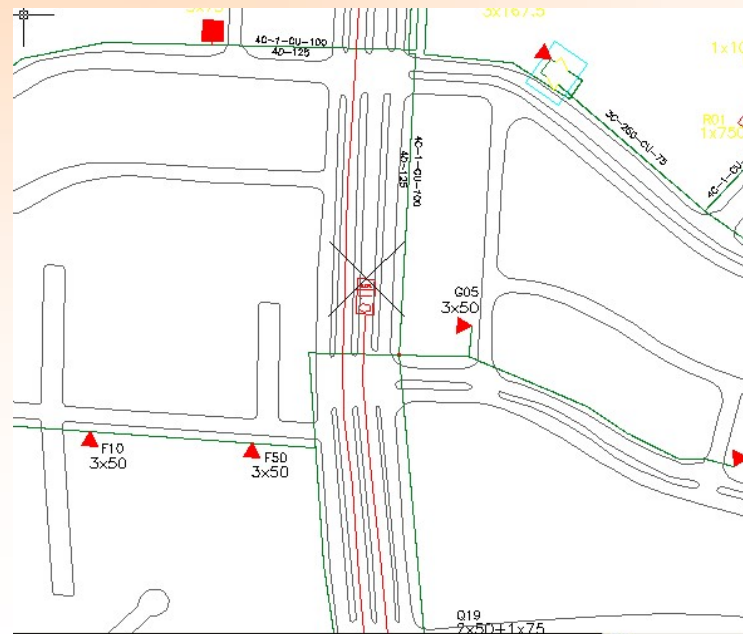
Produce a graphic visualization of transformer banks demand readings and colors "marks" depending of transformer utilization factors



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VEHICLE LOCALIZATION PROGRAM (VEHLOCP)

Show vehicle position on top of distribution network map
in order to improve operation and reduce outages time.



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Main Characteristic

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- Stand alone or Multiple Licenses or corporative licenses were no limitation on number of users.
- First version has more than 28 years.
- PADEE have help optimized network planning in rural areas, urban areas, agricultural areas, tourist areas, industrial areas and petroleum areas.
- Use AUTOCAD or Bricscad as drawing platform. Autocad is the best seller cad software in the world and PADEE can use any version.
- It may work with online diagram where not maps are available
- Link High and Low Voltages, and customer analysis in one software.

Main Characteristic

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- **Keep distribution network information reliable, updated and Centralized.**
- **Produce and update and coherent information**
 - Intelligent, digital and automated Network maps
 - Locate clients or customers geographically and link then to the electric network
 - Keep a geographic reference historic load demand
- **Reduce required project and studies and works management**
- **Well planed distribution network reduce maintenance and operations cost and optimize resources.**

Benefits

- **Electric Distribution network knowledge**
 - Primary, Transformer bank, and secondary network and substations
 - Map customers locations
 - Customer linked to distributions network poles
- **Quick**
 - Geographic location of elements by it's attributes or characteristics
 - Off-line emergency conditions simulation
 - Speedy and secure network map update
- **Distribution systems data base**
 - Unified, Centralized & Reliable

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Benefits

- Engineer Applications to evaluate and planning the distribution network
- Man Hour Labor reduction in:
 - Updating distribution network Projects
 - Distribution line projects.
 - Operation planning projects
 - Budget, bill of material
 - Network Inventory (Network Market Value)
- Improve activities of:
 - Maintenance
 - Operations
 - Design
 - Billing

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Medium and Long Term Benefits

- Increase productivity
- Save in project efforts
- Recover clients and Improve billing performance
- Reduce Energy losses, investments and operations spends

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Example of Fault Events Flow Diagrams

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**Fault events
Flow diagram
solving
procedure**

