# Engineering Software Research Center

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# SANSPRO V.5.10 (since 1989)

#### Fully Integrated Structures and Buildings Analysis, Design, Volume & Cost, and Drawing Generator

- Model Oriented Approach
- Preliminary Design
- Easy to create building and other structures model (Layout based model)
- Load Generator: DL, LL, Wind Load, Earthquake Load, Earth pressure
- Latest 2012 Indonesian Earthquake Map
- Finite Element Model: Truss, Frame, Shell (DKQ)
- Large Scale Static and Dynamic Analysis
- Direct Integration and Impact / Blasting Load
- Construction Stage and Nonlinear Static Analysis
- Multiple Towers, Multiple Diaphragms
- Floor Slab Design (CIP, HCS, Metal Deck)
- Prestressed Beam Design
- Steel and Concrete Design, Shearwall Design
- Concrete Capacity Design
- Automatic Pile and Raft Foundation, Tie Beam and Pilecap Design and Cost Calculation
- Strip Foundation Design for Bearing Wall
- Volume and Cost Estimation
- Automatic Detail Drawing Generator

#### **Model Oriented Approach**



Building Model is the center of SANSPRO design procedures.

#### Some building design examples:



## Visual Modeling



What you see is what you get

## Latest Indonesian Earthquake Map 2012



Automatic calculation of: Fa,Fv,Sms,Sm1,Sds,Sd1,av,cu,To,Ts

## Multiple Towers, Mutiple Diaphragms



Multiple towers, with multiple diaphragms per tower

## Floor Slab Design in one click



Concrete Slab rebar, bent bar, short and long span

## **Concrete Capacity Design**



Changeable Capacity design parameters

### **Visual Design Report**





Color coded stress ratio and rebar percentage



Design Results View by Section

## **Shearwall Design**

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Edge, horizontal, vertical rebar, and Boundary rebar

#### Automatic Pile Foundation Design Input : Pile capacity (axial, lateral, tension), cost Output : Pile design report calculation, Foundation drawing, volume and cost



Foundation Design Parameters (Capacity Design)

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	Defastored New Force, Static Load Vol = 0.46 ton, Scal = 0.00 ton, solel		Dean
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	Lateral Capacity of One Dile, 23 = 5.00 ton	N.	Story Effe
	Number of Files needed for lateral Force, Np3 = 2 piles		Earthque
	Total Lateral Capacity (f1*f2 = 1.0), Vn = 10.00 ton -> 0K	40000	LoadComb - A
	Total Lateral Capacity (F1+F2 > 0), Vn = 10.00 ton -> HOT OK	(49239)	
	Number of Silve sected No. a. 1 ottas		
	summer of states means, op		
	b. Second Trial (with Filerap Weight)		
	Unfactored Max Force, Static Load Pu1 = 17.92 ton, Pcap1 = 25.00 ton, np1+2		00
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	Unfactored Max Force, Temp. Load, F=1.0, Sul = 44.10 ton, Pcap1 = 32.50 ton, np1=2	1	
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	Number of Files needed for Compression Force. Nol = 2 piles		
	Total Compression Capacity (f1*f2+1.0), Pn = 50.00 ton -> OK		
	Total Compression Capacity (Use f1*f2), Pn = 50.00 ton -> NOT OK		
		P1	
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	Compres: P1 = (Mmax+Wprap-Po)/np = 14919.00 kg, dPMx = 12226.05 kg, dPMy = 16414.07 kg	F1	
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Foundation Design Report (Capacity Design)



Pile Foundation Drawing in seconds

## **Volume and Cost**

Input : Unit Cost (Concrete, Rebar, Formwork) **Output :** Cost of Concrete, Rebar, Formwork per floor, Rebar requirement per size, Steel/Concrete Ratio, Price per m2



Parameter Unit cost: Concrete, Rebar, Formwork



Total price, equivalent thickness, rebar ratio

## **Drawing Generator**

Generate whole floor layout, column and beam layout, column and beam detail into one big DXF file



Parameters for SANSPRO Drawing Generator:

Paper size and margin Spacing between drawing Numbering format: 1-G12 or G30 Rebar number modification Moment Redistribution Factor Output format : Autocad<sup>™</sup> DXF Format

## Generated layout and detail drawing at CAD



Overall view of all drawings generated in seconds



Floor Layout Drawing with Beams and Columns index



Column Detail Drawing



Beam Detail Drawing

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## **OTHER ESRC PRODUCTS :**

#### **TOWERWIN - Steel Telecommunication Tower**



#### **NROOF - Light Steel Roof Truss**



#### **CFSB- Cold-Formed Steel Building**



#### **REBARVOL - Rebar Detailing and Estimation**



ESRC provides services for developing special purpose engineering software for building industry and research/academic community.

#### **SOILWIN - Soil Laboratory Data Processing (12 Modules)**



#### NSLOPE - Slope Stability Analysis



#### NBRIDGE – Steel Composite Bridge Design

NERIDGE - Integrated Steel B	ridge Design, (C)	Nathan Madutujuh, ESRC, 1999-2012				
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Complete list of ESRC products : www.esrcen.com