INDONESIAN NATIONAL ROAD GEOTECHNICAL DATABASE (INROG) OF MINISTRY OF PUBLIC WORKS INDONESIA

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BACKGROUND

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Indonesia and the roads

- 2770 National Road Link in 33 Provinces with more than 40.000 KM length
- The Mean of AADT (Annual Average Daily Traffic) in 2007-2008 is 7948. *Simply*, 7948 vehicles will pass the road in a day.

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Problem

Landslide in Semarang Toll Road Section A in 1991
Fernandez, 1991

Landslide in Padang, Sumatera Baraf after Earthquake in 2009
Faizal, 2009

Soft Soil Problem in Sape, Nusa Tenggara Barat
Fernandez, 2008

Problem

Expansive Soil in Ngawi, Jawa Timur
Hardiansyah, 2008

Landslide in Ruteng, Nusa Tenggara Timur in 2009
Faizal, 2009

- More than 20 geotechnical problem occur in Indonesia each years
- Each problem takes place in Expansive soil, soft soil, and volcanic soil.
- **THERE'S NO GEOTECNICAL PROBLEM DATABASE MINING.**

Objectives

- To mining geotechnical problem occur in the national road
- To mining geotechnical data
- To give user geotechnical information via internet
- To give one of parameter in decision support







INDONESIAN NATIONAL ROAD GEOTECHNICAL DATABASE CONCEPT

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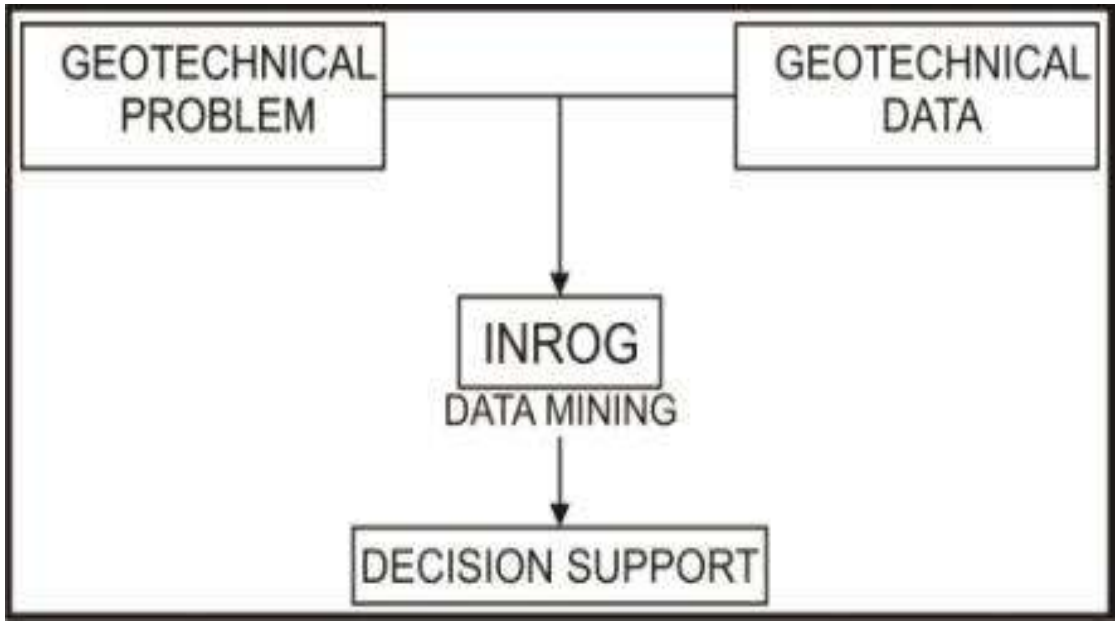
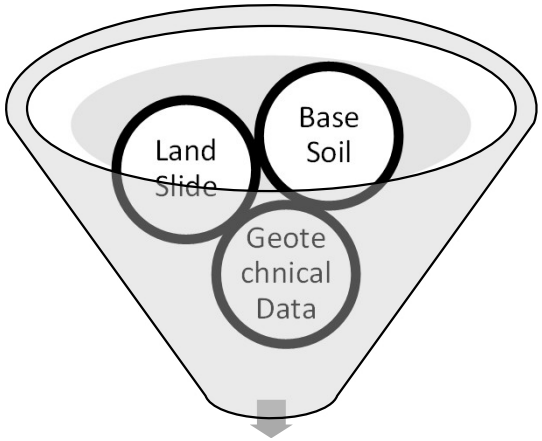
Concept



INROG concept **is data mining of geotechnical problem and geotechnical data** that can give a support of decision making in geotechnical problem solving. User can see, download, and upload geotechnical problem and data via internet

Geotechnical Problem and Data



EACH DATA HAS A POSITION (LATITUDE AND LANGITUDE)

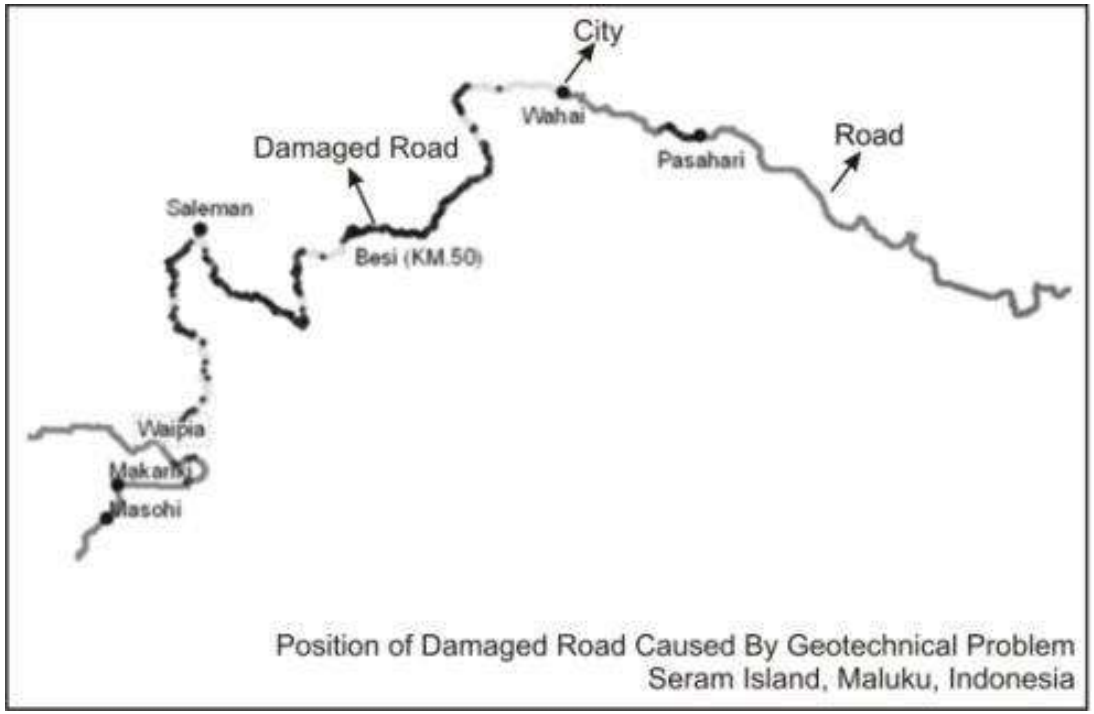
Geotechnical problem occur in national road typically divide in 2 parts:

- Base soil
- Land slide

Geotechnical data split in 2 parts:

- Main data : Geotechnical Investigation and laboratory data, for example: Bore log, DCP, slope and landslide survey, road material survey, geotechnical problem survey, index properties, and engineering properties,
- Supporting Data : Geology, earthquake, rainfall, KM post, road map, and geotechnical project location

Data Mining



Data mining in geotechnical problem is not just collect the problem, but closed to ***geotechnical information discovery***, for example: damaged road caused by geotechnical problem patterns in Seram Island, Maluku Province







THE MAKING OF INROG

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Data Structure

No	Data/Map	Type	Attribute
1	Land slide	Point	Province, road link, latitude, longitude, land slide type, slope type, land slide material, caused by, impact, photo, time
2	Natural slope	Point	Province, roadlink, latitude, longitude, slope material, vegetation, slope height, slope angle, photo, time
3	Man Made slope	Point	Province, roadlink, latitude, longitude, type of man made slope, slope material, trap, trap height, trap engle, structure, photo, time
4	Road Material	Point	Province, roadlink, latitude, longitude, time, photo, owner, access road, gradation, abration, LL, PL, PI, top soil, volume, product
5	Earthquake	Point	Latitude, longitude, magnitude, time
6	Bore	Point	Name, latitude, longitude, elevation, sample, depth, bor master, water level, photo, link to laboratory data
7	DCP	Point	Name, latitude, longitude, elevation, depth, qc maximum
8	Inclinometer	Point	Name, latitude, longitude, depth, link to data
9	Piezometer	Point	Name, latitude, longitude, link to data
10	Extensometer	Point	Name, latitude, longitude, link to data
11	Control Point	Point	Name, latitude, longitude, elevation
12	Rain Gauge	Point	Name, latitude, longitude, link to data
13	Geotechnical Project	Point	Name, latitude, longitude, report
14	KM Post	Point	Name, latitude, longitude
15	Public work office	Point	Name, latitude, longitude
16	Police office	Point	Name, latitude, longitude
17	Damage Road	Point	Latitude, longitude
18	SMS info	Point	Latitude, longitude, description
19	Road	Line	Province, roadlink, length, geotechnical problem, land slide, road material, natural slope, man made slope, geology formation, rock type
20	Geology Structure	Line	-
21	Province	Polygon	Name, Area, population, total length of national road
22	Rainfall Prediction	Polygon	Amount
23	Geology Formation	Polygon	Code,formation, description

Code Programming

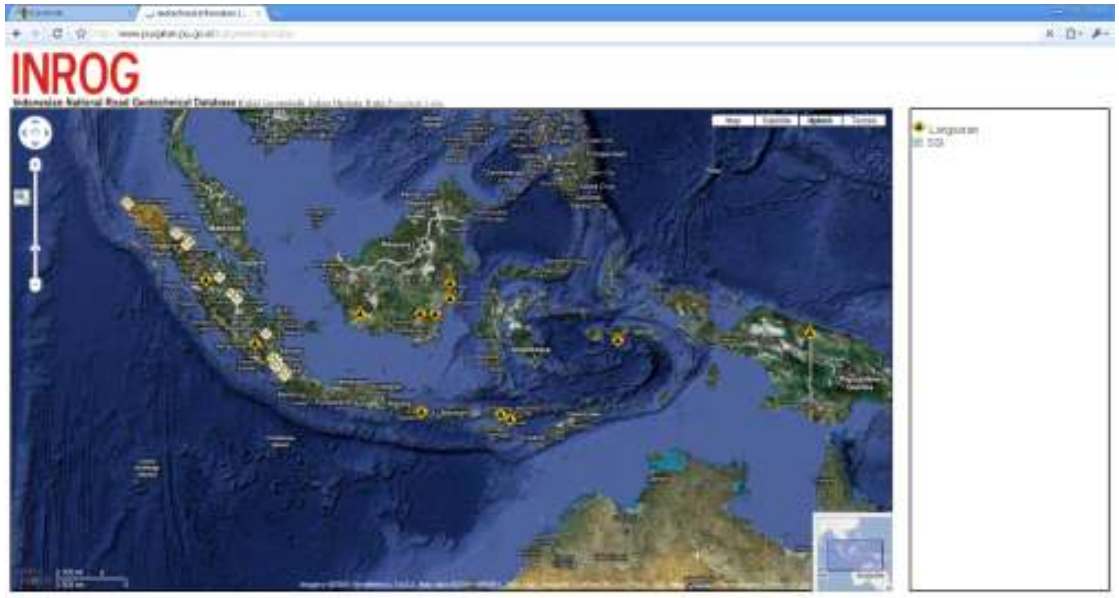
The main page of INROG has 3 menus:

- *Viewer menu*, user can see the data and map
- *Download menu*, user can download data and use in another application (google earth, mapwindows, mapinfo, global mapper, etc)
- *Update menu*, user can update geotechnical data.

Code programming for viewer menu developed by PHP, java script, MYSQL, and Google Map API. Example of viewer menu code for INROG:

```
<script
src="http://maps.google.com/maps?file=api&amp;amp;v=2&amp;amp;key=ABQIAAAANslsXzF_ijrl3NsOW8
cFRxS2_kZaDxJcfT23ALtfDN_nyzZacxTIN3cyVB_4j6qLR_EQWBP_T_WSKw"
type="text/javascript"></script>
<script src="js/koneksi_kuari.php" type="text/javascript">
</script>
<script src="js/koneksi_sdms.php" type="text/javascript">
</script>
<script src="js/kuari.js" type="text/javascript">
</script>
```

CONCOLUSION



- INROG concept is data mining of geotechnical problem and geotechnical data that can give a support of decision making in geotechnical problem solving. User can see, download, and upload geotechnical problem and data via internet.
- INROG is web mapping application containing geotechnical data and geotechnical problem
- INROG developed by PHP, MYSQL, java script, and Google Map API.
- It necessary to make an online tool for INROG benefits evaluating.

TERIMA KASIH

BHINEKKA TUNGGAL IKA
TAN HANA DHARMA MANGRWA

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