MIS ENVIRONEMENTAL CENTER IN INDUSTRIAL RISK CONDITIONS

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ABSTRACT: This paper propose to present a system for monitoring and detection of noxis, a prognosis and an assisted decision with a complete information of the decision factors regarding industrial risk and meteorological conditions. The system achievement is that it informs the decision factors in territory about what decisions shall be carried-out while an accident may occur. The primary scientific object is a complete connection between all concepts of technological risk, noxis monitoring, industrial security, chemical alarm plan, avoiding accidents, simulation, assisted decision, prognosis, modelling gasses dispersion in the atmosphere in relief and meteorological conditions.

KEYWORDS: MIS, data acquisition, management, open system.

1.PRESENTATION:

To design (project) a medium monitoring and prognosis system in technological risk conditions also with a complete analysis about the impact over populated areas you must consider the main goal, the objectives-complexity-, area, technological risk conditions and medium pollution. To evaluate and anticipate the impact of the pollutants in air, water and soil, there are created concentric network in the technological installation, round about the pollution units and close by the impact areas. The technological risk will be minimised in the pollution units, so it can be at a tolerant acceptance level, risk will be avoid and emergencies that may occur will be promptly solved. The system main target (in the pollution units) is to avoid, to launch the alarm before accidents occur, and to maintain the installations at technological levels that doesn't affect medium factors. The system role (in areas District Council-Civil Protection Inspectorate-Medium Protection Agency) is monitoring the pollution units, the areas that might be affected by the pollution factors for keeping the at a tolerance acceptance level and to minimise their effect. Regarding the type of the pollution agent and its aggressive impact over human factor complex system are chosen to eliminate this problem. A special chase is the chemical plant that is located near-by a power-plant unit and that are due to the fact that noxious effect is cumulated.

The main target for what the system is created, is sustaining the human effort (correlated in the monitoring units, in intervention and supervision organisms), in taking the optimum solutions while the chemical alarm may occur, and that can be realise by informing the personnel about the specific measures he must take at his work place. Thus can be relief also conjugated noxis by the action of the operative units in the limitrophe areas. The system finality will consist in a united and operative database that will be able to present solutions for avoiding or/and minimising risks for the units and near-by areas and regions.

System has four 4 components:

A) preventive through monitoring the technological process, the medium and the utilities
B) Analysis and prognosis if a chemical accident may occur
C) A complete information of the decision factors
D) Evaluator- fulfilling the conditions of medium nonpollution- for APM

Factors regarding chemical alarm plan are:

- local dispatcher that determents the cause of the chemical focal (in the unit and powerplant)
- chemical alarm dispatcher that puts in use the chemical alarm plan if an accident that affects not only the unit but also the near-by areas occurs
- Civil Protection Agency in the accident spreads and affects outside unit areas

This system is conceived regarding these aspects but also regarding regional aspects; the sub-system-involving prognosis, monitoring, simulation and information consists in

- to determine, locate the place were the focal is
- to determine the noxis quantity dropped
- to determinate and to present the meteorological parameters
- to determine the cloud shape and his evolution using a mathematical algorithm
- to present the evolution on the region map
- to inform in a real time the decision factors in the unit, powerplant and in the region

In a chemical alarm plan you must take in consideration the place where the focal is and also the quantity of noxix dropped so that you can have a specific scenario. The chemical focal, the shape, dispersion and cloud evolution have on their basis the exact location of the place where accident occurred and also the noxis quantity dropped in the atmosphere. The system offers, in an operative guide regime (offers a maximum of information's to allow the human factor to take the optimum decision), all the information's needed to choose the right scenario, every type of scenario being finalised in an adequate plan. Due to the complexity of the system a great attention will be awarded to the redundancy functions for solving a degraded system use, operator access being made under a password for every type of data base (partial or global) and even for the maintenance and calibrated functions for each sub-system.

In making this project work there are some basic stages that allow the adaptability and personality of the system for each application:

- to characterise the industrial object through out the protection terms and maximum level of tolerance accepted for noxious emission that has impact over air, water, soil and humans
- to analyse the position of the populated regions from the industrial objective, and also to analyse medium and geographic conditions

- to define the events that can be consider a real danger to the industrial objective: earthquakes, floods but also the phenomenon's that can be caused by the industrial objective to the population
- to complete a full statistic data base with the main events that took place till 10 years ago, their impact
- to establish a graphic chart about the noxious emission especially where the statistic data may create confusion or are inconclusive, or where the specific analysis was not full done; to establish the personnel number and competence, equipment's.
- to define a system for processing data's in order to reach the propose goal, to complete the existing equipment network with what is necessary.

To create the system you got to elaborate the following modules:

Data module for technological process

This module role is monitoring the technological parameters, framing through the limits, alarming and avoiding if accident occur (break conducts followed by noxious emission), locating the exact place and the quantity of noxious emission. Generally you observe pressures, debits, temperatures in the established areas for risk study.

Sensors, analysis modules

This module role is monitoring the noxious and gases emission in the atmosphere. Regarding the type of the gases, noxious emissions that can affect the environment and the checking points number sensors analysers and specific systems are being chosen. For choosing the type of sensors and equipment's you must take in consideration also the work environment: corrosive gases, explosive gases, powder. A great attention must be paid to the system maintenance and to the calibration of the measure sensors. For the dispersion analyses and the prognosis evolution calculation, sensors and analysers will be ordered in adequate places (locations) and for gases they will be ordered on different level (verticals, concentric on horizontals)

Meteorological module

The meteorological module's role is to track down atmospheric conditions in an automatic mode, where noxious emission takes place. If the analysis involves larger areas affected, the meteorological stations are ordered so they can relief wind directions and their characteristics: temperature, direction, speeds, solar radiation, humidity, raining quantities, atmospheric pressure.

Gases dispersion, noxious emissions, impact area prognosis, simulation module

The main factors involved in the atmospheric dispersion are:

1. Severe unstable atmospheric conditions lead to a quick mix and dispersion of the particles in the air, while stable atmospheric conditions prohibit that to happen
2. Mechanical turbulence due to the wind, soils, forests and hills
3. Existing temperature gradient till 30 meters high in the atmosphere
4. The most unfavourable condition for dispersion is the quiet atmosphere from silent nights and early mornings

Another unfavourable situation for the dispersion is a not enough higher ceiling. The most favourable situation for a dispersion is a strong sun and wind breezes in the superior levels of the atmosphere. During the exploding gas recipients, the area affected is not limited, so you have to consider also the following factors:

A. Direction of the gas (horizontal, vertical), speed and wind direction
B. General weather conditions and field topography
C. Speed, temperature and gas emission concentration

The potential risks due to the stocking and transporting the chemical products are being analysed in 3 different stages:

- identify the risk
- analyse the impacts
- analyse the causes of the risk and minimise them

The dilution of a toxic cloud in unstable atmosphere conditions is much quicker and achieves a shorter distance than in stable conditions: from this we deduce risks in stable conditions (no wind and clouds are on a low level) For powerplants the dust concentration acquisition is achieved with analysers: NO, NO2 ,O2, SO2 ,CO ,CO2. The possible effects of pollution, chemical accident from powerplants and the impact towards populated areas are being emphasised by a program packet that presents the evolution of the toxic cloud and the dispersion analysis through a map. Through the screen the noxious and gas emission is being presented also with the speed and wind direction and the stability class. The required data's that allows a visualisation of the medium concentration are being provided by packet programs that modulates the pollution emission processes for the gas, liquid or biphasic stages, evaporation, dispersion, heat radiation, explosions and fires. The medium concentrations for a long period of time and for an existing receiver are important as a distinct field; every checkpoint of the module network (concentric toward the pollution source) has two plane co-ordinates and an attached concentration class.

The distinctive value field of the concentration classes is assimilated to a data field type Soundings and it is overpass in a batch-mode through a digital map of the interest area, thus obtaining a geographical link in time between the pollution substance (dispersion, medium concentrations) and the environment. Time studying evolution of the medium concentrations, in a geographical context allows reaching at the results classified in:

- geographical results. We obtain these results from direct information's as: pollution cloud dimensions, affected area parameters- classes of concentrations, regions, districts that are affected
- the impact towards medium, population in particular, by processing a data base that contains information's about the attributes of the affected objects, presenting the number of inhabitants that are affected by lethal concentrations.

This program packet will be implemented by the Medium Protection Agency and also by the Civil Protection Inspectorate.
Potential beneficiaries are highly pollution industrial agents: Romag Drobeta, Arpechim Pitesti areas, Petromidia, RAFO Onesti, Chimcomplex, Oltchim Ramnicu Valcea, pollution cities, APM, IPM etc.

This is an open system that can have a flexible configuration regarding the complexity of the situation and the level of supervision, a real LEGO of the environment protection and can be extended also for different risk factors that may occur.

2.FINAL CONCLUSIONS:

Environment protection and industrial security are global problems but they become priorities especially for Central and East European countries. The concept is an innovative but also a global one. Environment protection and security are analysed together in as a system that contains: permanent analysis, risk analysis, pollution flux surveys, prognosis in risk conditions, alarm networks, operative guide- key deliver system

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