

Summer Student Programme Report

September 2019

1 Project 1- CMS Chemical Inventory

The goal of the project was to create a local database of chemical agents used, handled and stored at CMS. Based on data provided by Territorial Safety Officers (TSOs) CMS Chemical Inventory was created. Inventory gathers all safety information required by HSE Unit on chemical agents used at CERN. Those information include: commercial and chemical name, CAS number, supplier, state of matter, location, quantity, hazards and hazard statements, contact person and attached Material Safety Data Sheet (MSDS). In addition, created CMS Chemical Inventory provides information on applications and systems in which described chemical agents are in use, includes ready-to-use Safety Posters for all chemicals considered as hazardous and allows to generate a report of all chemical agents present at CMS.

Commercial	CAS number	Chemical	Supplier	Date receive	Date expired	Building number	Room	Building name	Quantity	Physical hazard	Health hazard	Environmental	Hazard statement	System/Equipment	Contact person(s)	MSDS/Safety
old Breco oil		mixture	liquid	Cognis		304			200	none	none	none	n/a	empty oil	Rami Maury	
STANLEY POLAR 250		mixture	liquid	Dr. Scherer	04/09/2019	3020		US34	3m ³	none	eye (irritant)	none	H315, H315	flow extinguish	Mahtara Alina	
ELKALUR GLA 993 H1		mixture	solid	Elkalub		3025	R1	URCS5	18	none	none	none	n/a	sliding drum	Nicolas Singrat	

Figure 1: CMS Chemical Inventory interface.

CMS Chemical Inventory is a user-friendly Microsoft Access tool that can be updated and used by all users. It enables easy access to safety and stock information, allows both the Fire Brigade and the Medical Service to localise and identify hazardous and dangerous chemical agents in the building in case of emergency, provides the important source of information for HSE Unit and ensures the inventory to be updated.

After receiving positive feedback from HSE Unit, CMS Chemical Inventory will be an integral part of future Chemical Register for the Environment, Health and Safety Support **CERES** (database of all chemicals used at CERN). That was agreed with computing team, which confirmed possibility of integration of both inventories.

Project resulted in numerous additional tasks, for example:

- chemical booklet - guideline on ordering, shipping, storing and handling of chemical agents at CMS;
- CMS Chemical Safety and Management Procedure- how to assess the level of risk from chemicals at CMS at CERN.

2 Project 2- Finite Element Analysis in ANSYS

The goal of the project was to preliminary verify the strength of the platform under the extended water storage for the underground water mist fire extinguisher at CMS. The project was a result of performed nozzle calculations, which indicated that water supply time provided by existing system is not sufficient for protecting all zones from fire. The idea was to increase volume of water by installing additional tank next to the existing one.

In order to run simulation the geometry and 3D model of the extended water storage, based on site visits, inspections and available documentation, was constructed in the CAD software. Based on material specification and applied loads structure was verified and weak points and areas of tensions were identified. It was concluded, that the design has required strength and will withstand load of extended water tanks. Detailed results can be found in the dedicated report.

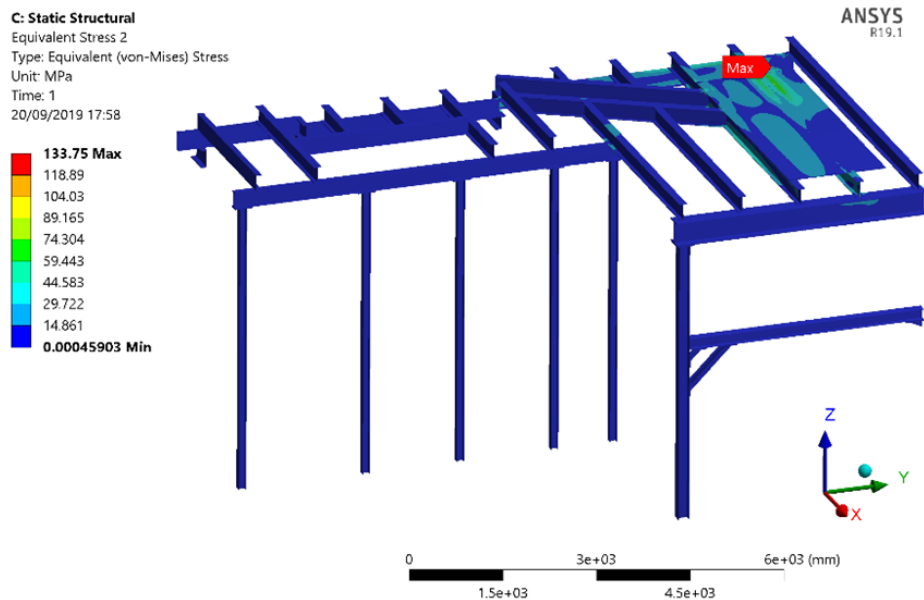


Figure 2: Verified platform structure.

The project was done in collaboration with CMS Integration Office as well as mechanical engineers team, who will continue the work. Obtained results will serve as a starting point for detailed structure verification. That has to be done in order to confirm gained results and to validate whether or not existing platform has to be strengthen in prior of installing additional water tank.

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