



Availability and Reliability Foundational Pillars of the NA-CONS Project at CERN.

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North Area: A Unique Infrastructure

The North Area (NA) experimental zone and its Transfer Tunnel (TT20) were built in the 1970s at the CERN Prévessin site as part of the Super Proton Synchrotron (SPS) Program. Initially dedicated almost exclusively to physics experiments, the NA has over the years also served a very dynamic programme of R&D and tests for experiments at CERN colliders, other labs, and for the Physics Beyond Colliders (PBC) initiative.

It's consolidation has been approved in 2021 (NA-CONS project) that will see a major two-phased facelift in the upcoming years covering renovation of equipment, infrastructures and services to retrieve it's initial level of reliability and bring the facility into compliance with modern safety requirements.



CERN Accelerator Complex

Availability in North Area & Faults Statistics

NA-CONS Study report released in 2018: exhaustive description and analysis of the actual condition



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Cryogenics	0.25
	0.25
Civil Engineering	0.5
Users	1.75
Vacuum	2
Electrical Systems	3.5
Industrial Controls	4.6
Detector Technologies	6.25
Beam Control	6.5
Beam Instrumentation	9.5
Robotics	13.85
Targets	13.9
Experimental Areas	24.4
Radiation Protection	26.42

Fault Duration by Systems



Systems	Before consolidation	After consolidation	Risk reduction factor
Industrial Controls	2.25	0.45	5.0
Cooling & Ventilation	1.2	0.15	8.0
Experimental Areas	1.2	0.6	2.0
Electrical Systems	-	-	
Handling Engineering	1.8	0.45	4.0
Cryogenics	1.35	0.15	9.0
Power Converters	1.8	0.3	6.0
Civil Engineering	1.2	0.6	2.0



Accelerator Fault Tracking Tool

The Accelerator Fault Tracking (AFT) was considered the most viable solution as it is already used by the rest of the CERN accelerator complex and provides a streamlined and centralised repository of machine faults and consequent beam downtime.



A Hidden Sector Campus (HSC) for feebly-interacting particles (and precision physics) and also an Intense programme of QCD measurements/test beams/R&D for neutrinos.

Ref: Gaia Lanfranchi – INFN

Lift for TCC8	station for converters in BA80 / CRG: centrifugal helium pumps
Safety: Gas network, Gas detection, ATEX ventil. SUSI 918, EHN2 video ECN3, EHN2	 Safety (95%): Underground & Surface Fire detection & Alarm. Fire detection in false floors BA80 Sprinklers underground (shafts) Fire detection EHN2 galleries Pilot test for new access control system

EL: BA80, TDC2, TCC2, UPS, secured network

CV: underg. ventil, chilled water, cooling station, CT2, new cooling

EL: BA81, BA82, EHN1, EHN2, ECN3

BA81 and 82 (for PC)

CV: ventil. surf bldg., primary pumps circuits, new cooling station in

References

CT2, cooling plant,

Chilled water piping

Irrad cables TDC2.

"Report from the Conventional Beams Working Group to the Physics Beyond Collider Study", CERN-PBC-REPORT-2018-002

"Strategy for the consolidation and upgrade of the North Experimental Area - "NA-CONS Study Report"," EDMS 2042932, 2018.

"Addendum to the NA Consolidation Study Report" – EDMS 2144442, 2019

Conclusions

Reduced availability and reliability of NA owing to subsequent downtime due to degraded condition of facility amplified by obsolescence of various equipment's led to operation related issues for the facility. North Area consolidation project will help re-instating full safety compliance, recovery of reliability thereby enhancing efficiency and support the potential upgrades required by future physics.

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ACCELERATOR RELIABILITY WORKSHOP 2022

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