

# MAIN TURNAROUND WORKS

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Our company boasts solid experience in extraordinary maintenance on major petrol and petrochemical plants both in Italy and abroad.



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### HOW TO HAVE A SUCCESSFUL TURNAROUND

Our Company has a great experience in the execution of Turnarounds, so we summarize here below our past experiences and the success factors and the problems that we face in Turnarounds.

### SUCCESS FACTORS

1. Good preparation (Company / Client): a very good preparation phase, with the right timing, with the right team from Contractor and Client side, with the right experience on the field, is the fundamental key factor
2. Create a solid Contractor + Refinery team with a real win / win vision: honesty, open-mindedness, common objectives between Contractor and Refinery
3. Put in place a "Realistic planning": it is clear that shorter deadlines imply a significant reduction in costs, but no planning can be carried out without being feasible, realistic and safe ("real" safety cannot be separated by realistic milestones)
4. Preparation: do not focus only on Contractor. Preparation times with Contractors are always longer and that is a good thing .... in theory. But sometime during the preparation the Refineries are more and more "concentrated" on the Contractors and little on themselves, and their capacity in terms of men (number and experience), means and internal organization capable of respecting the often very challenging TAR objectives.

### PROBLEMS... AVOID THE USUAL "BOTTLENECK" DURING TAR:

5. Work permits: Are there enough people from the Refinery to follow the permits in real time? Were they designed to be quick, clear and to avoid unnecessary bureaucracy?
6. Washing area: it is essential to have a suitable area considering the equipment to be washed, to correctly manage the washing area by avoiding the accumulation of parts to be washed and by allowing an effective entry / exit of arts to be washed
7. Inspections: The waiting times for inspections leads to huge delays. It is therefore essential to have the right number of inspectors.
8. Scaffolding: having the right number of teams involved in modifying scaffolding and well made scaffolding will produce considerable time saving and performance improvement
9. Unexpected work: How is it possible to have 1 or 2 years of preparation and then 40 to 50% of unexpected work during the shutdown phase?
10. "External" Refinery Supervisors without a complete knowledge of the site: often on the ground many Refinery Supervisors are "external" to the Refinery and so with very small knowledge of the Refinery, which doesn't help Contractors at all
11. Crane management: Crane management by Refinery with external companies can often be inefficient and cause considerable loss of time
12. Manage internal conflict (Refinery Operation / Refinery TAR team): Contractors are often between internal conflicts between Operation / TAR team of the Refinery, and therefore suffer tensions and delays due to these conflicts
13. Manage technological innovations (eg Phased Array: inspectors with the right experience): Technological progress is fundamental, but it is necessary to be certain of the real positive return from the use of these new technologies and from the preparation users of these new technologies. Often systems like email - Roser - Teams - Primavera etc. provide conflicting information or, above all, it is not clear which is the "master" source for the information
14. It is not possible to manage Companies without a Contract: if the mechanical Contractor is responsible for managing other contractors (such as lifting, scaffolding, insulation, painting), for this management to be "real" and effective it is necessary that between the contractor and these companies have a contractual relationship, otherwise only confusion and low efficiency will arise
15. Active Supervisors are needed and not just "Arbiters": some Refinery Supervisors are reduced to being simple "arbiters", ready to report errors / inefficiencies of the Contractor, while their fundamental purpose should be to facilitate the work and above all to prevent such errors from occurring. They should prevent rather than report the problem that has already occurred
16. Document management: before and during a TAR a huge amount of documentation is produced (technical specifications, statement of works etc.). Ineffective document management causes waste of time and, above all, could cause incorrect works/installations and therefore produce real dangers for people and systems. Some examples of incorrect document management are the circulation of documents with incorrect revisions, the total lack of specifications, work instructions communicated only verbally.
17. Warehouse management of the Customer's materials: the correct and effective management of materials (including for example bolts, gaskets, blinds, etc.) is essential for the success of a TAR. The unavailability of materials, often despite a long preparation phase for the TAR, can produce delays often difficult to recover. This management could be made more efficient by hand in all the materials to be installed over to the Contractor before TAR beginning, following a validation process by Refinery and Contractor.



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## 2002 - 2023 MAIN TURNAROUND WORKS

CUSTOMER	YEAR	PLANT	H.EX/A.C	COLUMN	VESSEL	FURN/BOIL	OTHERS	DAYS	TOT MAN-HOURS	REMARKS
ENI (Taranto)	2002	ALL (THERMAL, CRACKER, CDU, RHU/HDC, EST)	80	2	30	2	X	30 DAYS	20.170	
	2003		120	4	40	2	X		22.300	
	2006		210	12	64	4	X		28.000	
	2009		175	6	51	2	X		27.000	
	2010		75	3	28	2	X		21.000	
	2011		42	6	18		X		23.500	
	2012		431	39	212	27	X	2x30 DAYS	49.814	
	2013		10	5	11	2	X	28+18	6.981	
	2014		39	8	8	2	X	29+19+12	29.904	
	2017		146	23	61	23	X	60 DAYS	129.000	Piping: 140 tons CS + 40 tons Alloy
	2018		133	9	15	11	X	30 DAYS	60.000	
2020	100, 200, 300, 1.300, TSTC	14	1	5	1	X	10 DAYS	8.000	3.6 tons CS - 0.2 tons P11	
IES (Mantova)	2002	ALL PROCESS AND OIL PLANTS	43	6	38	12	X	30 DAYS	9.071	
	2004		49	6	11	3	X		6.500	
	2006		45	11	25	5	X		17.109	
	2007		51	4	12	3	X		6.100	
	2008		61	6	24	3	X		6.900	
	2009		65	6	5	3	X		12.500	
	2010		73	11	23	6	X		15.000	
	2011		23	2	0	2	X		5.000	
	2012		50	7	35	5	X		11.000	
	2013		25	3	1		X		4.400	
	2014		102	22	52	5	X		7.700	
IPLM Busalla (Genova)	2002	ALL PROCESS AND OIL PLANTS	48	5	18	2	X	30 DAYS	9.071	
	2004		46	18	22		X		6.500	
	2005		31	3	13	4	X		17.109	
	2007		60	6	22	4	X		6.100	
	2009		67	11	28	6	X		6.900	
	2010		42	7	15	7	X		12.500	
	2011		45	7	15	7	X		15.000	
	2013		67	7	3	5	X		5.000	
	2015		67	10	28	7	X		11.000	
	2018		67	7	22	7	X		4.400	
	2020		79	10	33	10	X		7.700	
	59	11	22	4	X	40.000	Piping: 15 tons			



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TOTAL (Roma)	2002	ALL PROCESS AND OIL PLANTS	69	6	25	4	X	22 DAYS	6.800	
	2003		78	6	32	6	X		8.800	
	2005		62	4	31		X		5.900	
	2007		70	7	31		X		43.000	
	2010		91	10	68	9	X		52.000	
	2012		30	19	60	7	X		18.000	
LUKOIL ISAB (Siracusa)	2011	LOT 1	154	14	27	4	X	28 DAYS	70.000	
	2015	LOT 1	199	16	30	5	X	45 DAYS	120.000	Piping: 5" medium; 85 tons CS; 13.700" welded
	2020	LOT 1	192	14	44	5	X	70 DAYS	190.000	Piping: 8" medium; 67 tons PS; 206 tons CS; 13.700" welded
API Falconara (Ancona)	2002	ALL PROCESS AND OIL PLANTS	77					15 DAYS	20.170	
	2003		65						22.300	
	2004		33						28.000	
	2005		80						27.000	
	2006		184						21.000	
	2007		130						23.500	
	2008		134						23.700	
	2009		125						23.000	
	2010		130						23.500	
	2011		98						25	12.000
	2011	V. BREAKING					X	30	19.000	
	2013		73					15	7.700	
	2015	ALL PLANTS	171					38	20.239	
	2016	ALL PLANTS	43					13	6.076	
	2017	ALL PLANTS	87				X	18	11.400	
	2018	ALL PLANTS	75				X	16	9.500	
	2019	ALL PLANTS	92				X	19	12.950	
2020	ALL PLANTS	92				X	22	12.500		
2021	ALL PLANTS	61				X	38	9.200		
EXXON Trecate (Novara)	2003	FCC	135	25	80	6	X	30 DAYS	24.000	
	2008	FCC	135	25	80	6	X		24.000	
	2014	FCC	129	25	63	3	X	42 DAYS	86.000	
	2021	FCC + MEA	44	14	23	4	X	27 DAYS	35.000	Piping: 8.000 mhrs, 85 hot works, 15 tons prefab. 2.800", install. 1234"

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RAFF Milazzo (Siracusa)	2004	VAC, GASCON	122	14	44		X	30 DAYS	24.000	
	2006	VACUUM	58	2	20	2	X		12.000	
	2007	TOPPING	130	4	15		X		21.500	
	2008	VACUUM	58	2	20	2	X		12.000	
	2012	VACUM +HDS2	87	5	18	2	X		18.000	Piping: 130 tons + 130 tie-ins
	2015	TOPPING 3	57	3	4			24 DAYS	30.000	
	2016	TOPPING4 VACUUM DEA2	90	4	20	1	X	45 DAYS	50.100	
TAMOIL	2004	CDU, ISO, DEWAX	100	15	27	3	X	30 DAYS	15.000	
	2009	CDU, ISO, DEWAX	136	23	38	6	X		20.000	
ENI Marghera (VE)	2005	V. BREAKING	44	7	19	2	X	30 DAYS	17.500	
ENI Sannazzaro (PV)	2002	FCC, VACUUM	149	16	60	1	X	30 DAYS	24.000	
	2006	FCC, VACUUM	149	16	60	1	X		24.000	
ENI (Livorno)	2002	ALL PROCESS AND OIL PLANTS	78	10	33	6	X	30 DAYS	12.500	
	2003		84	12	37	5	X		14.000	
	2004		85	15	39	7	X		17.000	
	2005		78	14	41	8	X	60 DAYS	38.600	
	2006	Shut-down								
	2007	ALL PLANTS	126	18	78	5	X	23	88.000	Piping: 51 tons CS
ESSO Augusta (Siracusa)	2004	ALL PROCESS AND OIL PLANTS	111	38	42	11	X	30 DAYS	60.000	
SONATRACH Augusta (SR)	2019	R1 - R4 - R5 SNF - PSU	94			3	X	40 DAYS	74.500	Piping: 40tons CS + 35 tons P11 < 2" = 1009" > 2" = 5435"
TOTALENERGIES Grandpuits (Francia)	2014	TOPPING	54	7	12	6	X	40 DAYS	19.200	Piping: 490" 1/2" ÷ 1.1/2" 1312" 2" ÷ 36"



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CUSTOMER	YEAR	PLANT	H.EX/A.C	COLUMN	VESSEL	FURN/BOIL	OTHERS	DAYS	TOT MAN-HOURS	REMARKS
TAMOIL Collombey (Svizzera)	2015	FINAL CLEANING	321	50	143	X	30	40 DAYS	25.000	
STATOIL Kalundborg (Danimarca)	2016	HEAT EXCHANGERS ALL PLANT	170	X	X	X	X	40 DAYS	35.000	
GUNVOR Rotterdam (Olanda)	2018	CR1 CR2 GOP	50	10	16	11	101	24 DAYS	35.000	Piping: 1,5t of P9 6t of CS
TOTALENERGIES Le Havre (Francia)	2019	TOPPING D11	72	9	18	3	X	30 DAYS	45.860	Piping: 17 tons
ZEELAND Refinery (Olanda)	2016	Hydrobon, Platformer, DHT, Merox, Amine, Zolfo	99	12	36	20	X	60 DAYS	45.000	Piping: 15 tons
TEOA TOTAL OLEFIN Anversa (Belgio)	2022	COLD/HOT SECTION	86	7	33	13	258	30 DAYS	65.800	Piping: 223 chronos
TOTALENERGIES Feyzin (Francia)	2022	AROMATICI	45	11	25	1	6	45 DAYS	32.000	Piping: 13 tons
TERA TOTALENERGIES ANTWERP-BELGIUM	2023	NC3	47	7	20	0		55 DAYS	102.551	Piping: 7000" PRF + 1200" INST

For ENI Livorno, ENI Taranto and other Italian refineries reduced/short shut down are not included.