Reference:

P. Janik, *Regulations as a cause of obsolescence or opportunity for new material development?*, 4th ESA REACH Workshop, ESA HQ Daumesnil, Paris, 18th October 2022

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Regulations as a cause of obsolescence or opportunity for new material development?

4th ESA REACH Workshop 18th October 2022, ESA HQ Paris Daumesnil,
Introduction to Session III – Managing substitution and obsolescence

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Outline

- Obsolescence management of Materials and Processes in European Space Sector
- Examples of obsolescence in M&P and its impacts
- Obsolescence risk assessment and management tools
- Overview of the 4th REACH WS - Session III content

OBSOLESCENCE MANAGEMENT OF MATERIALS AND PROCESSES

New ECSS Requirements on Obsolescence Mgmt.

ECSS-Q-HB-70-23A (2017)

Definition: *…transition from availability to unavailability of a material, mechanical part or process from the manufacturer or supplier…*

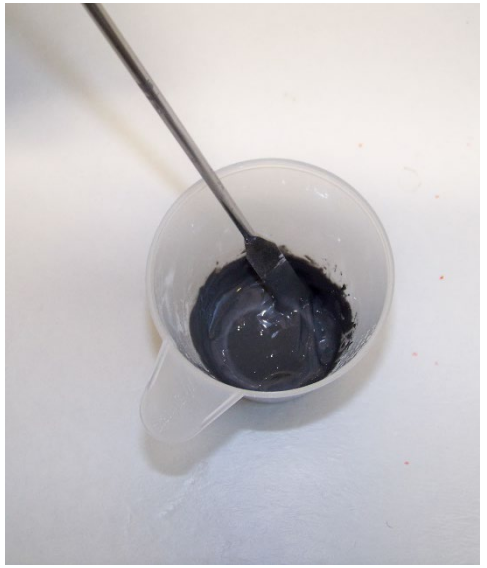
- Recommendations to tackle obsolescence at a project level
- OM team: PM/TO + Procurement + M&P support + PA/QA + Design/Production + H&S + REACH/Legal support
- Obsolescence management to be covered within MPCBs
- Clear examples of OM plans, templates, and REACH regulation process flow

Updated **ECSS-Q-ST-70C rev2** (in 2019) has new requirement

4.1.3.i.6, ***...Identify and mitigate the risks linked to obsolescence of materials, processes, or mechanical parts at all levels of the customer-supplier chain...***

and refers to ECSS-Q-HB-70-23A (recommendations)

KNOW YOUR MATERIALS!



Sources of Obsolescence in M&P: Examples

Modification of Products/Processes (REACH or H&S policy, Green Deal, specific directives, company commitments, local regulations, on-site procedures)

- Epoxy resins: Removal of **BPA** → Formulation change → Significant impact on mechanical property
- Epoxy resins: **toluene-free** hardener (reflecting on REACH Annex XVII, Res. entry 48), small impact
- Silicone purification processes: **CMR solvents removal** to follow Directive 2004/37/EC carcinogens or mutagens at work (CMD) → some impact on the product's mechanical properties
- Polyurethane-based potting compounds & conformal coatings – REACH Annex XVII Restriction Entry 74 on the **use of di-isocyanates**, → risk of discontinuation of import to EU
- Polyurethane-based paints – removal of **toluene and di-isocyanates** from formulations (discontinuation of products), impact on processes with space heritage → costs for requalification of new alternatives

Discontinuation of products (triggered by REACH/regulatory constrains, material unavailable):

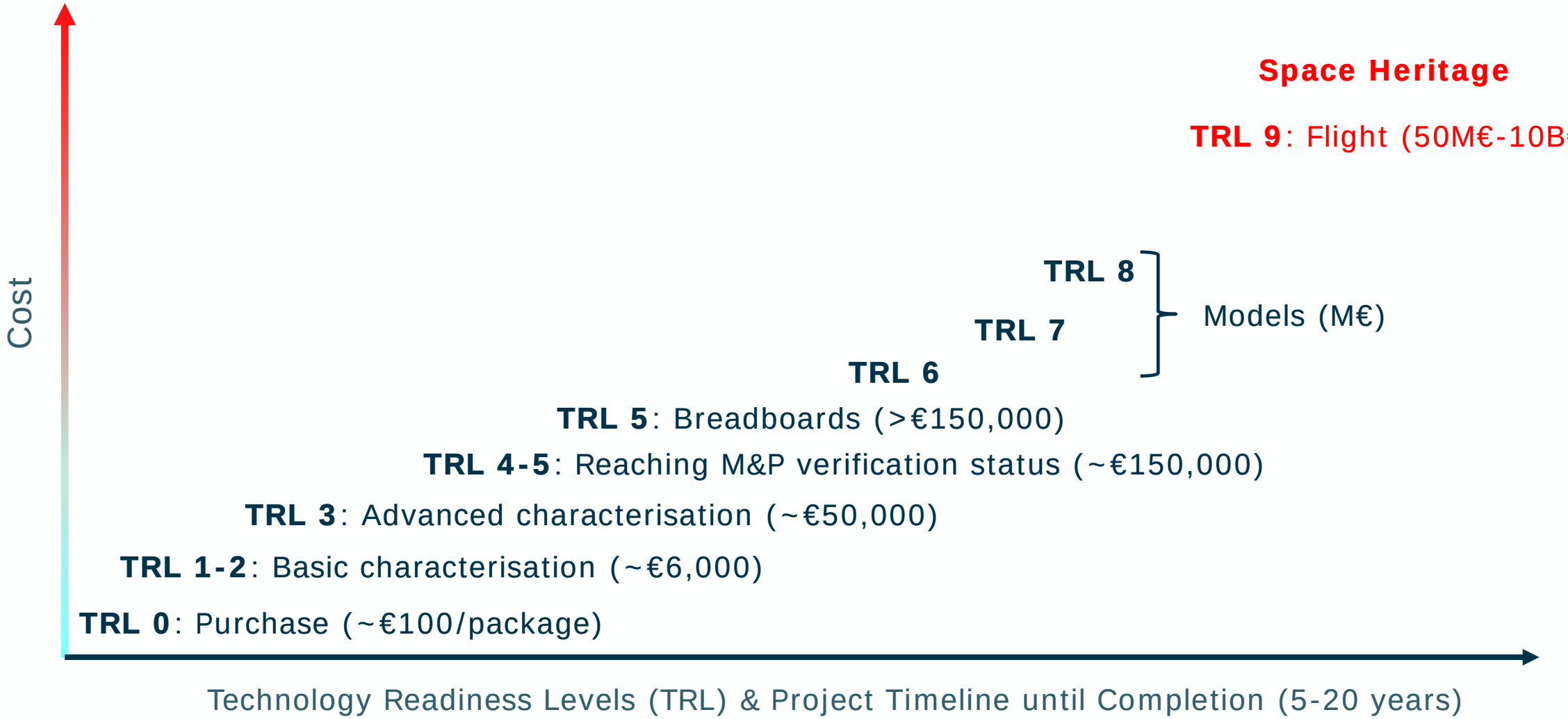
Epoxy resins: **NMP** – REACH Annex XVII Restriction Entry 71 on use of NMP, lead to discontinuation of high temp. hardener for epoxy, replacements available, significant impact on space heritage

- **$SrCrO_4$**-containing primer – Absence of Application for Authorisation by that specific manufacturer = "No use" → Substitution unavoidable!

New/Other: Sanctions, Import/export limitation, Restriction in procurement policy, User tracking (delays) etc...

Regulation-related Obsolescence

Obsolescence Impact Cost and Delay – Example of a new Adhesive in Optics



REACH/regulatory evolution used for OM

As per handbook ECSS-Q-HB-70-23A:

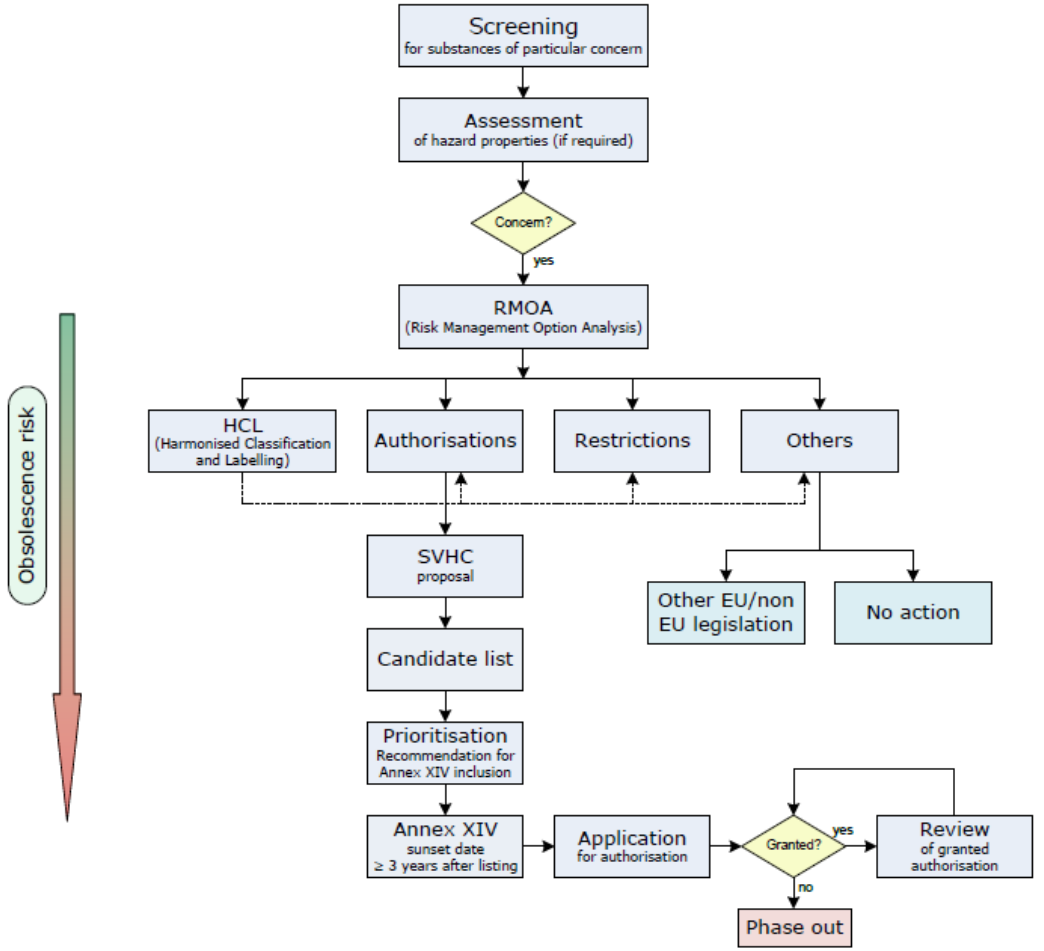


Figure D-2: Simplified REACH substances regulatory risk management process

1. Identify materials (BoM) intended for the project, DML is good source of info but it is not enough,
2. Identify substances within materials/processes and crosscheck with regulatory lists (Figure D-2 in ECSS-Q-HB-70-23A),
3. How? analyse Safety datasheets (SDSs) of chemicals/mixtures or Article 33 declarations for articles and safe use instructions from suppliers, (SDS may be mandatory as per 1907/2006/EC, Article 31).

Risk ranking:

1. The highest obsolescence risk is associated with the use of material under specific REACH Annex XVII restriction, which bans specific type of use (e.g. Toluene in adhesives intended for general public market)
2. High risk of obsolescence is associated with chemicals with Substance on Annex XIV (only EC-authorised use is allowed!) + other obligations
3. Process-unspecific REACH Annex XVII restrictions affecting the material of interest but not necessarily the use of interest
4. SVHC (candidate list) substance: indicates potential of becoming Annex XIV chemical (after ECHA Annex XIV recommendation)

REACH Status: General update Numbers in 2022

- EU REACH Registered substances: **23,050**
- EU REACH registrations: **103 015**
- ECHA's Cand. List – **460*** Substances of Very High Concern (SVHCs), grouped in **224** entries

*Number of reference substances for SCIP notifications

- **111** SVHC substances are recommended for Annex XIV
- REACH Annex XIV – Authorization list: **59** XIV – **248 applications** for authorisation (AfAs) received
- REACH Annex XVII – Restriction entries: **71**

  (multiple substance entries, analysis ongoing...)

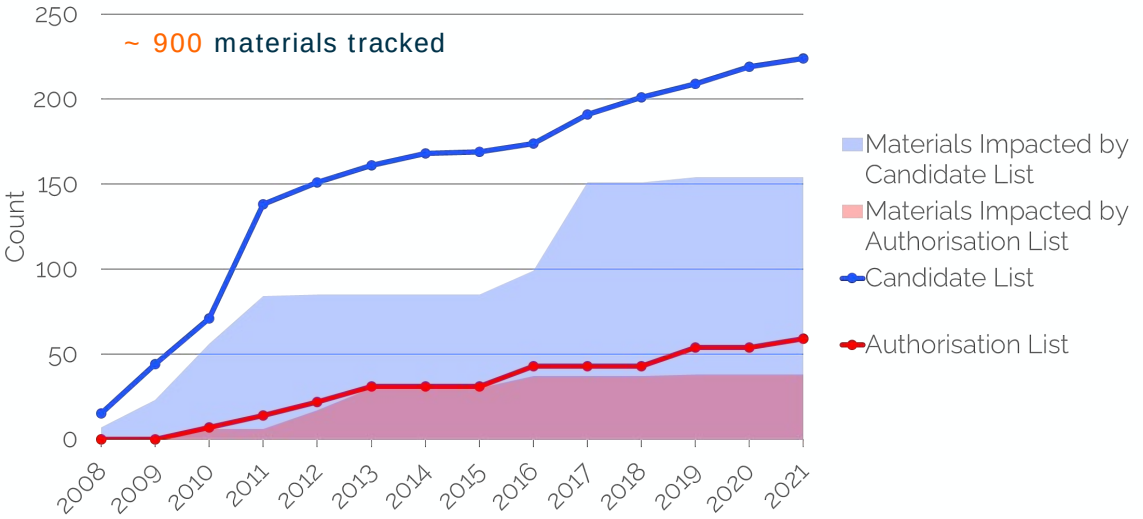


Figure 1. Evolution of entry count in relevant REACH lists and subsequent space relevant materials impact of over time, based on the bill of materials in the ESA REACH Tool.

>150 relevant materials affected

- OSG/REACH Tool analysis resp. points at
  - **14** REACH Annex XIV entries hit space-relevant materials,
  - **40** materials/mixtures with highest risk of obsolescence
  - **27%** of active materials impacted by Candidate List
- Analysis of impact of Annex XVII restrictions on space sector ongoing

Overview for the session III

- For obsolescence management in M&P follow ECSS! (Q-ST-70c & Q-HB-70-23A),
- Example of joint substitution efforts: MPTB-CTB/Lead-free Transition Work Group
- Obsolescence risk analysis based on REACH regulatory evolution: ESA REACH tool
- National space agency experience: Obsolescence management in M&P by CNES
- MAP Space Coating: View of material manufacturer
- Syliom Consulting: Obsolescence management in practice