

Building of a comprehensive competence program to drive process safety to the next level

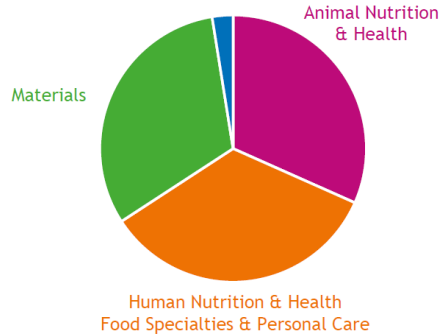
Process safety conference, Dordrecht, May 2019

Arthur Groot
Process safety competence manager DSM Resins & Functional materials

Content

- Introduction DSM and typical process safety risks
- Learning from an incident
- Improvement in competence management
- Conclusions

Royal DSM @ a glance: a company with a purpose (2017 numbers)



- Sales ~€8.6bn (9% growth in 2017)
- EBITDA €1,445m (15% growth in 2017)
- ROCE 12.3% (up 190bps)
- Global company with 65% of sales outside Europe
- Highly engaged workforce: ~25,000 employees
- Intrinsically innovative company: 21% sales from innovation
- ~ 45% sales from high-growth economies
- Strategy well aligned with the Sustainable Development Goals

DSM tops Dow Jones Sustainability World Index



Heerlen, NL, 13 Sep 2018 09:00 CEST

Royal DSM, a global science-based company active in Nutrition, Health and Sustainable Living, has once again been named the leader in its industry group in the [Dow Jones Sustainability World Index](#). The company has been recognized among the DJSI leader for 15 years running and held the number one position in the sector eight times.



The asset portfolio base (production facilities)



~60%
employees
outside Europe
(2017)
(37% - 2006*)

Examples of materials of DSM



DSM Engineering Plastics is supplier of high performance engineering thermoplastics as Stanyl®, ForTii®, ExoPaxx®, Akulon®, Arnite®, Xytron®, used in automotive, electronics, specialized industries and food packaging



DSM Dyneema is the global supplier of Dyneema®, the world's strongest fiber™, used for medical sutures, fishing, aquaculture nets, ropes, slings, cut-resistant gloves, vehicle & personal ballistic protection



Innovative resins for sustainable coatings systems, including: waterborne resins, powder resins and 100% UV curable resins



High-performance UV-curable optical fiber materials for high-speed fiber networks connecting the world

Typical process safety risks of Resins & Functional Material production plant



Unloading of trucks and storage

Substances can be toxic and flammable

Monomers and stabilizing



Batch reactor and handling raw materials

Most of the reactions are (slightly) exothermic

Human errors due to manual dosing



Storage of product

Instable products (liquids)

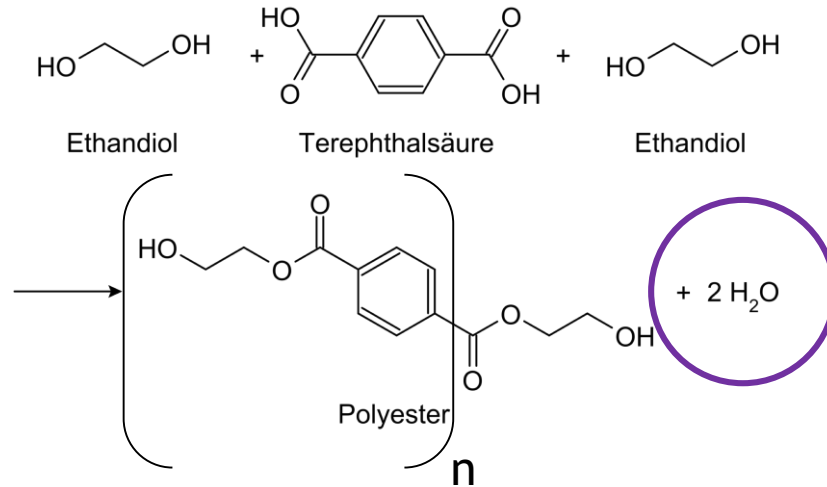
Dust explosion risk

Incident, 27th of September 2017

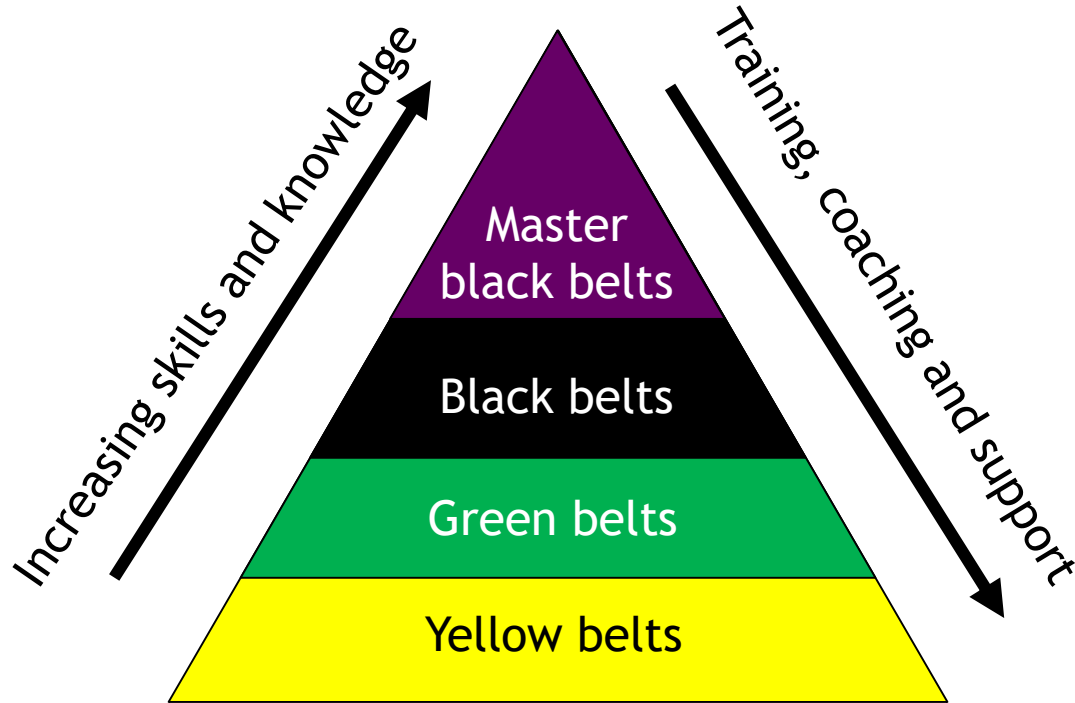


Polyester plant

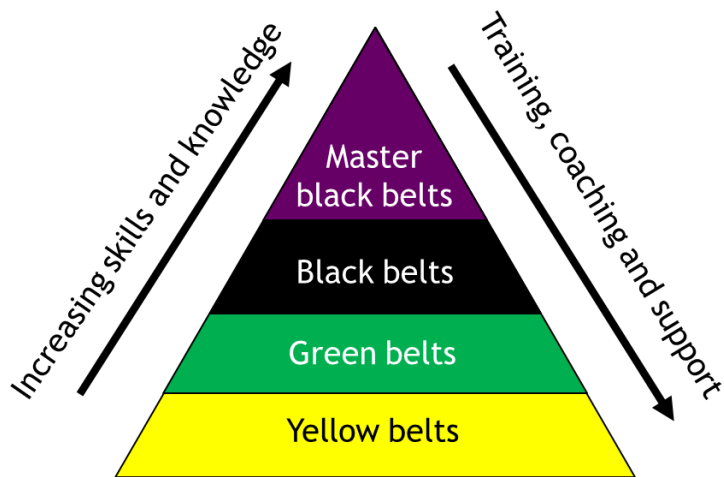
Example reaction of polyester:



Introduction of belt systems



Example: Qualification scheme for HAZOP chairs

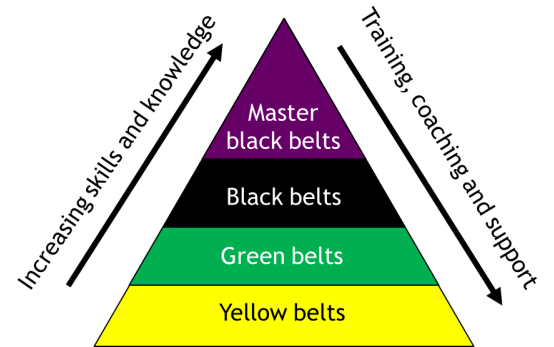


HAZOP	Basic		Skilled	Advanced
	YB (Yellow Belt)	GB (Green Belt)	BB (Black Belt)	MBB (Master Black Belt)
Roles	<ul style="list-style-type: none"> Hazop team member 	<ul style="list-style-type: none"> Participate frequently in team Only chair under supervision of a MBB as part of BB qualification process 	<ul style="list-style-type: none"> Chair Hazop studies 	<ul style="list-style-type: none"> By appointment only Coordinate BG Hazop community and develop competences Qualify BB Hazop Quality assurance
Examples of job functions: / positions that could have the role	<ul style="list-style-type: none"> Plant manager SHE manager Owner/Lead PSLC Technical professionals (new in DSM) 	<ul style="list-style-type: none"> Chemical engineer Process engineer Hazop BB candidates CHA BB 	<ul style="list-style-type: none"> Process Technology Lead Senior Process engineer Process Safety Lead 	<ul style="list-style-type: none"> By appointment only
Required Training	<ul style="list-style-type: none"> E-learning Hazop or 2-hrs training by GB or BB 	<ul style="list-style-type: none"> SHEBE (complete or PSLC-module) or Hazop GB training 	<ul style="list-style-type: none"> Hazop BB training 	
Knowledge	<ul style="list-style-type: none"> Awareness on topic Basic concepts of method Basic knowledge of process safety 	<ul style="list-style-type: none"> Understand the method Process Safety hazards Process Safety Standards Roles & responsibilities 	<ul style="list-style-type: none"> Apply method In-depth Process Safety hazards In-depth Process Safety standards & SHE Req. chapter 1, 4, 5&6 DSM Hazop Typical and rules of thumb CHA and how to use it Risk assessments overlapping with HAZOP; e.g. Area classification, Machine Safety Assessment, Packaged Units, QRA and site emergency response 	
People skills	<ul style="list-style-type: none"> Willing to contribute Speak up! Work to an efficient and effective result 	<ul style="list-style-type: none"> Able to actively participate in a Hazop discussion. Is a team player As BB-candidate can lead and instruct a Hazop team 	<ul style="list-style-type: none"> Able to lead Hazop team Able to lead complex discussions and know when to stop or to involve specialists. Ensures and enables stakeholders to play their role (e.g. project, plant, team, experts) Effectively communicate with management Reporting skills (e.g. efficient and unambiguous report using right tools) 	
Qualification	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> As BB-candidate coached by MBB 	<ul style="list-style-type: none"> Sent in 1-3 (depending on right quality) Hazop reports to MBB in order to learn from feedback provided by MBB Coaching session by MBB, MBB visits a Hazop chaired by the candidate and gives feedback Qualified when approved by MBB 	<ul style="list-style-type: none"> By appointment only
Re-qualification	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Participating in BB community 3-yearly peer to peer review of a Hazop report by another BB or MBB (every 3 years) 	<ul style="list-style-type: none"> Participation in yearly MBB meeting

Conclusions

1. Belt systems give sites mandatory guidance about competence needed per topic
2. Appointed person(s) is a professional
3. Recertification yearly to keep quality high and to learn

‘Keep it in the pipes’





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