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Development of Prospective Specialisations: Dam Engineering

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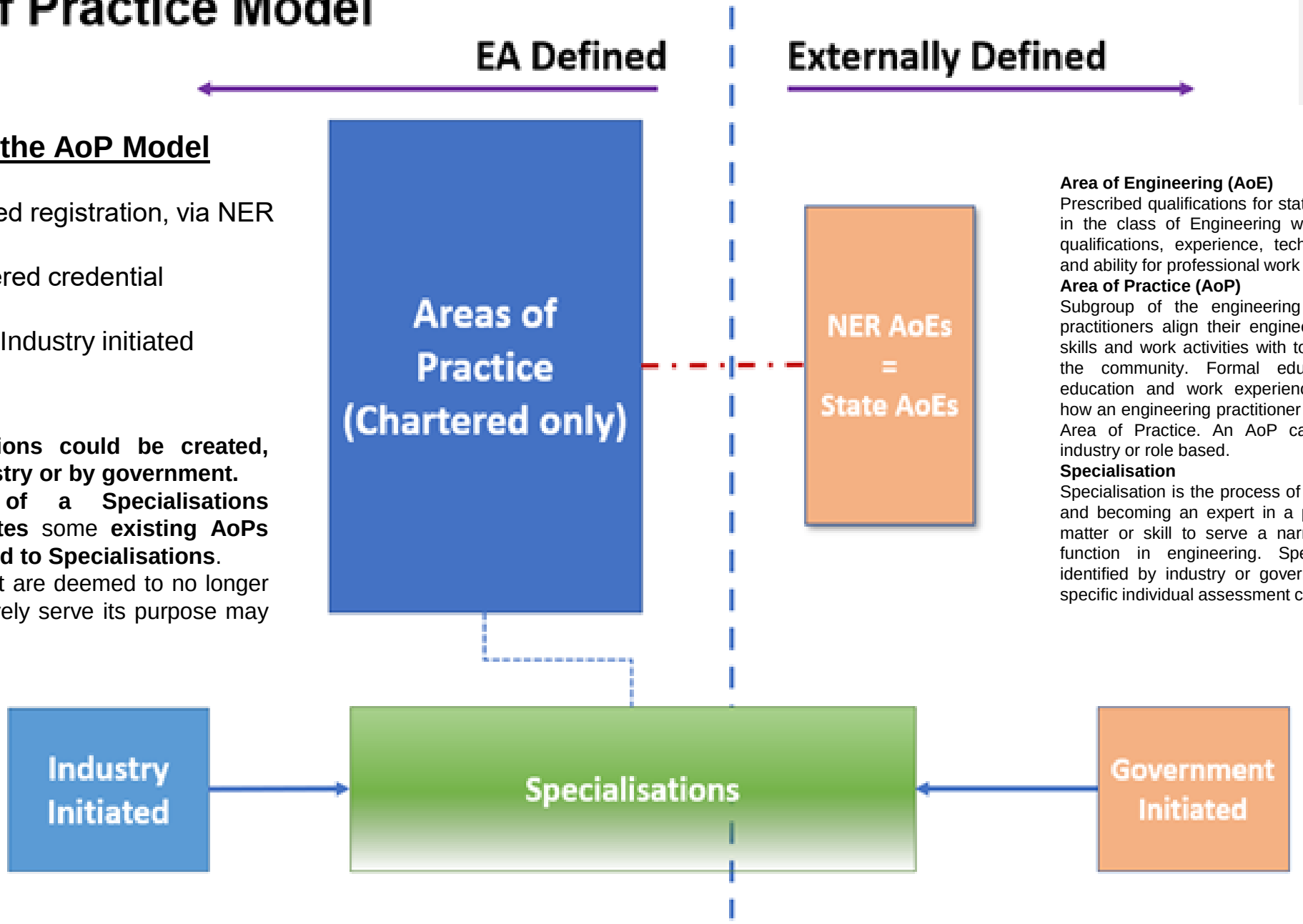
Areas of Practice Model

Summary of the AoP Model

AoE:
For States' based registration, via NER
AoP:
For EA's Chartered credential
Specialisation:
Government or Industry initiated

Note:
New specialisations could be created, initiated by industry or by government.
The **addition of a Specialisations category facilitates** some **existing AoPs being transitioned to Specialisations**.
Existing AoPs that are deemed to no longer be able to effectively serve its purpose may be retired.



Area of Engineering (AoE)
Prescribed qualifications for statutory registration in the class of Engineering with the minimum qualifications, experience, technical knowledge and ability for professional work practice.
Area of Practice (AoP)
Subgroup of the engineering profession that practitioners align their engineering knowledge, skills and work activities with to deliver value to the community. Formal education, informal education and work experience will influence how an engineering practitioner identifies with an Area of Practice. An AoP can be discipline, industry or role based.
Specialisation
Specialisation is the process of concentrating on and becoming an expert in a particular subject matter or skill to serve a narrow and specific function in engineering. Specialisations are identified by industry or government and have specific individual assessment criteria.

Transformation of Areas of Practice, AoPs

Existing 27 AoPs

AoEs* (16) – see next page

(to align with the States' registration requirements)

AoPs
- Asset Mgmt
- Building Services
- Cost
- Heritage & Conservation
- Leadership & Mgmt
- Oil & Gas Pipeline
- Pressure Equip. D Ver.
- Project Mgmt
- Risk
- Subsea
- Systems
- Construction

(plus new, reclassification and/or retire, for Chartered)

Specialisations
- SeaFreight Inspection Container Stands (Dept. of Agriculture, National)
- Vertical Transportation (NSW)
- Strata Inspectors Panel (NSW)
- Rail Track (in progress)
- Rail Signalling (in progress)
- Dam (in progress)

(plus new, reclassification)

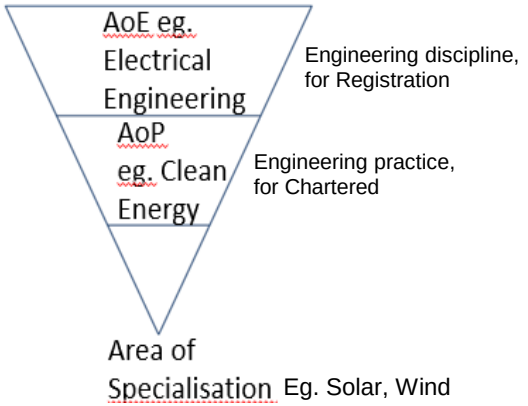
*

For **Registration**, EA issues the following for those with **Chartered in an EA AoP that has a corresponding AoE for State registration**.

- For **VIC**: "Report on Outcome of Qualifications and Experience Assessment".
  Eligibility for registration will then be determined by the BLA.
- For **QLD**: "Eligibility for RPEQ Registration (QLD)".
- For **NSW (Class 2 buildings)**, eligibility criteria for professional engineer registration is determined by NSW Fair Trading with requirements for qualification, knowledge, skills and experience plus, among others insurance
  (EA does competency assessments on behalf of NSW Fair Trading)

Further information on Registration:
- EA's Registration of Engineers, May 2020 document.
- https://www.engineersaustralia.org.au/credentials/registration/state-registration/assessment-state-registration#accordion-1591

Registration through EA: 2 pathways
1. NER – 5 competencies (Non-EA members)
2. Chartered – 16 competencies
3. https://www.engineersaustralia.org.au/credentials/registration/state-registration/assessment-state-registration



Pyramid of Strategy that guides our actions

What do we stand for?
Ethics, Principles, Beliefs

→ Focus on Customer
Achieve Together
Act with Integrity
Embrace Progress

Where are we going?
What do we aspire to achieve?
Hope, Ambition

→ Shapes the future of Australia – creating happy, healthy, prosperous and sustainable communities

What do we do?
Who do we do it for?
Motivation, Purpose

→ **To advance the science and practice of engineering for the benefit of the community**

How are we going to progress?
Plan, Goals, Sequencing

→ The Profession
The Membership
The Organisation

What do we have to do?
How do we know?
Actions, Owners, Timeframes, Resources, Outcomes

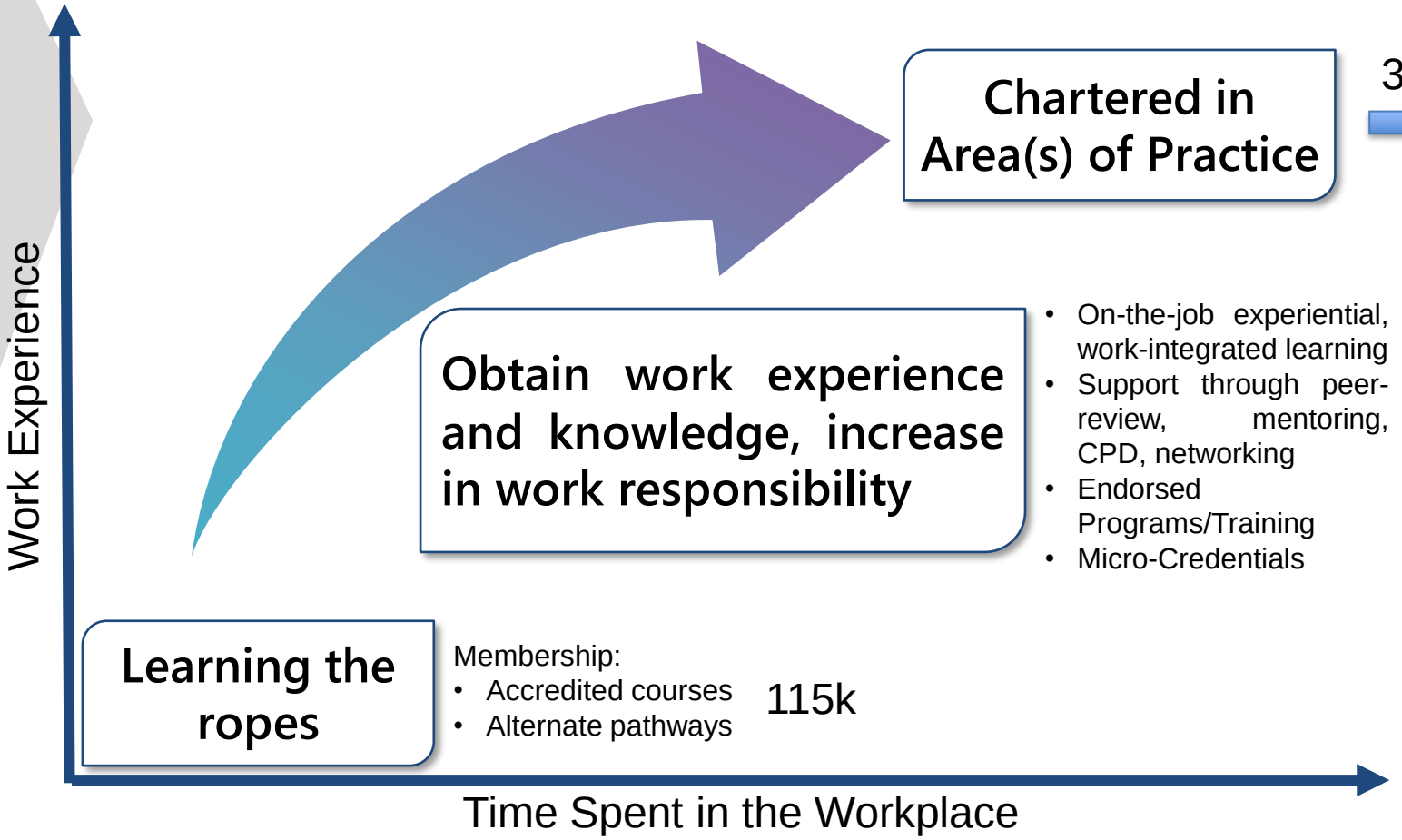
→ Actions to align with the current and future needs of the Profession, Membership and Organisation

Areas of Practice and Specialisations that are necessary to support the **progress and growth** of the nation **through engineering** for the benefit of the society.

→ To **meet the needs of members and the engineering profession**:

1. **Recognition of achievements** (AoP, Specialisations)
2. **Sense of belonging, affinity** and association **with EA: providing a home**
3. **Career advancement** through **networking, opportunities for upskilling (CPD) for performance excellence, maintaining relevance in industry, Chartered credentialling**.
4. **Facilitate the registration of engineers** in line with Statutory requirements
5. **Progress the engineering profession** through the delivery of the **value propositions for members, industry & profession.**

Typical Career progression of an Engineering Professional



- On-the-job experiential, work-integrated learning
- Support through peer-review, mentoring, CPD, networking
- Endorsed Programs/Training
- Micro-Credentials

Membership:
- Accredited courses
- Alternate pathways

- Recognition & Advocacy
- Competent, independent practice for performance excellence
- Specialist (PM) or Generalist (L&M)
- Career progression
- Facilitate the registration of engineers (at present or in the future) 25k

The **Area of Practice, AoP and Specialisation** provides the **avenue for recognition and advocacy** of all things related **to advance the engineering profession**.
AoP Model 2022:
AoPs – 27 + new
Specialisations – 3 + new

Being able to effectively support the engineering professional in doing so contribute to the attainment of the 5 strategic outcomes for the benefit of the members, industry and profession.

OUR STRATEGIC OUTCOMES

Supporting a contemporary and future-fit engineering workforce	Enabling a more diverse and engaged engineering community	Increasing the impact and value of our global network	Providing leadership to and on behalf of the profession for societal benefit	Increasing the recognition of the value of engineering to society

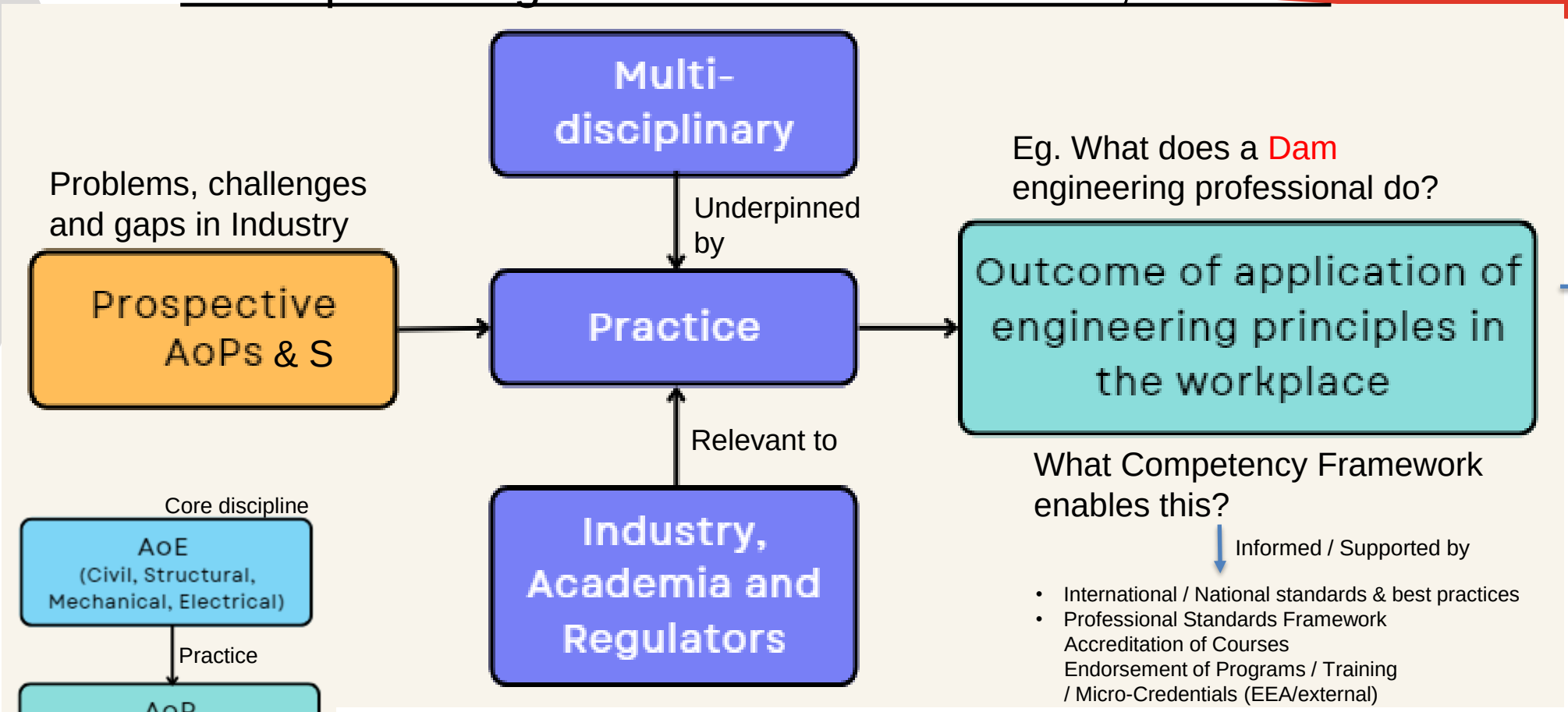
Considerations and Prioritisation of new AoPs & Specialisations

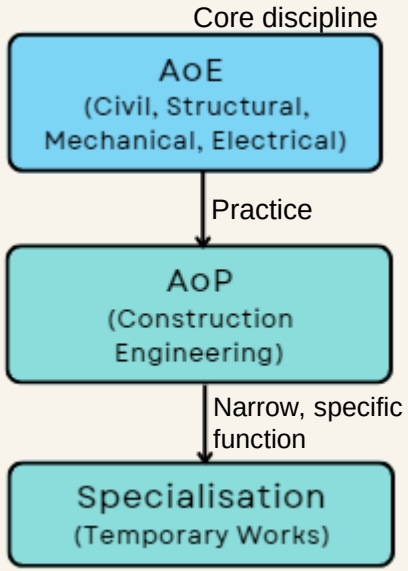
Considerations of prospective AoPs and Specialisations are based on the following, which may interrelate:

- **Important to the engineering profession and country** (based on the engineers in practice, census 2016/2021 data, surveys: ERGO/Pollinate, e.g. Manufacturing, 39k engineers, census 2016)
- **Necessary to support Australia's present and future economic needs** (e.g. Hydrogen, Maritime, Transport, Water, Defence, Agriculture etc)
- **Support for Federal and State government plans** (>$110B in Rail projects over the next 10 years, Nuclear for AUKUS Nuclear-powered Submarine deal)
- **Industry demand, interest from stakeholders** (ACA, RTSA, ITEE, IE, TAs etc)
- **Business case for representation** (e.g. Clean Energy in line with Australia's Net Zero Emissions Target by 2050)
- Recent and **emerging trends in engineering** (e.g. Cyber, Software Engineering)
- Other relevant considerations **in line with EA's Vision and Strategy** of "Advancing Society through Great Engineering"

Note: prospects that meet a combination of the above will take precedence over others

Conceptual diagram of an Area of Practice, AoP & S





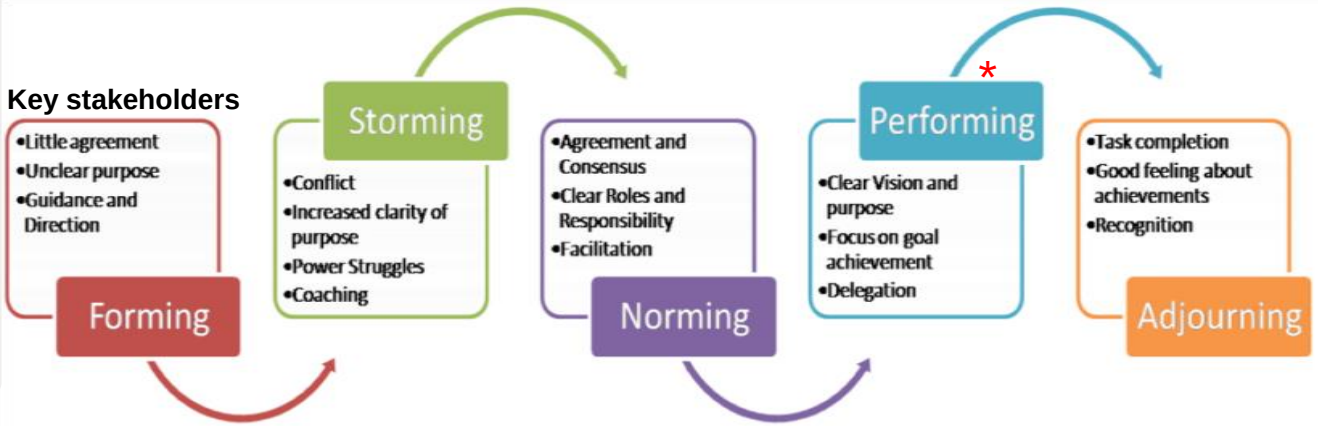
AoE, AoP and S

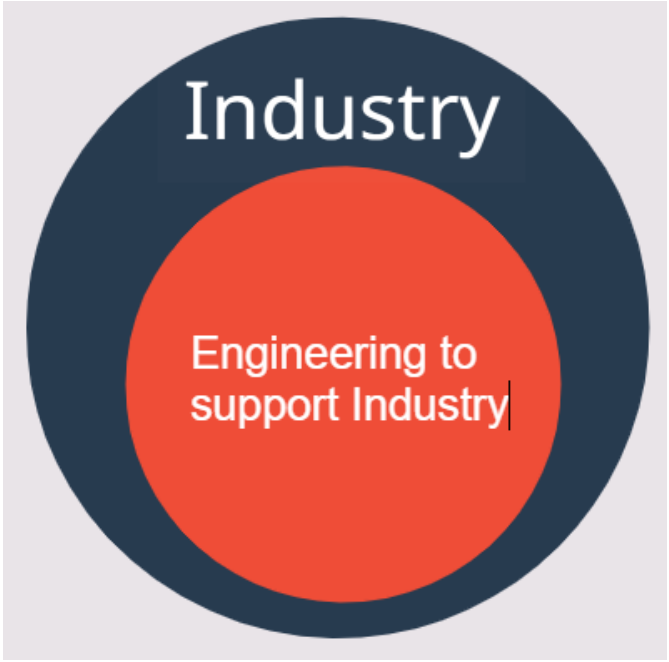
An **Area of Practice, AoP** is a **subgroup of the engineering profession** that **practitioners align** their **engineering knowledge, skills and work activities with** to **deliver value** to the community in the workplace. Formal education, informal education and work experience will influence how an engineering practitioner identifies with an area of practice.

Specialisation is the process of concentrating on and **becoming an expert in a particular subject matter or skill to serve a narrow and specific function in engineering**. Specialisations are **identified by industry or government** and have **specific individual assessment criteria**. Specialisations could emanate from an AoP or otherwise.

Area of Practice & S development

Tuckman's Group Development Model

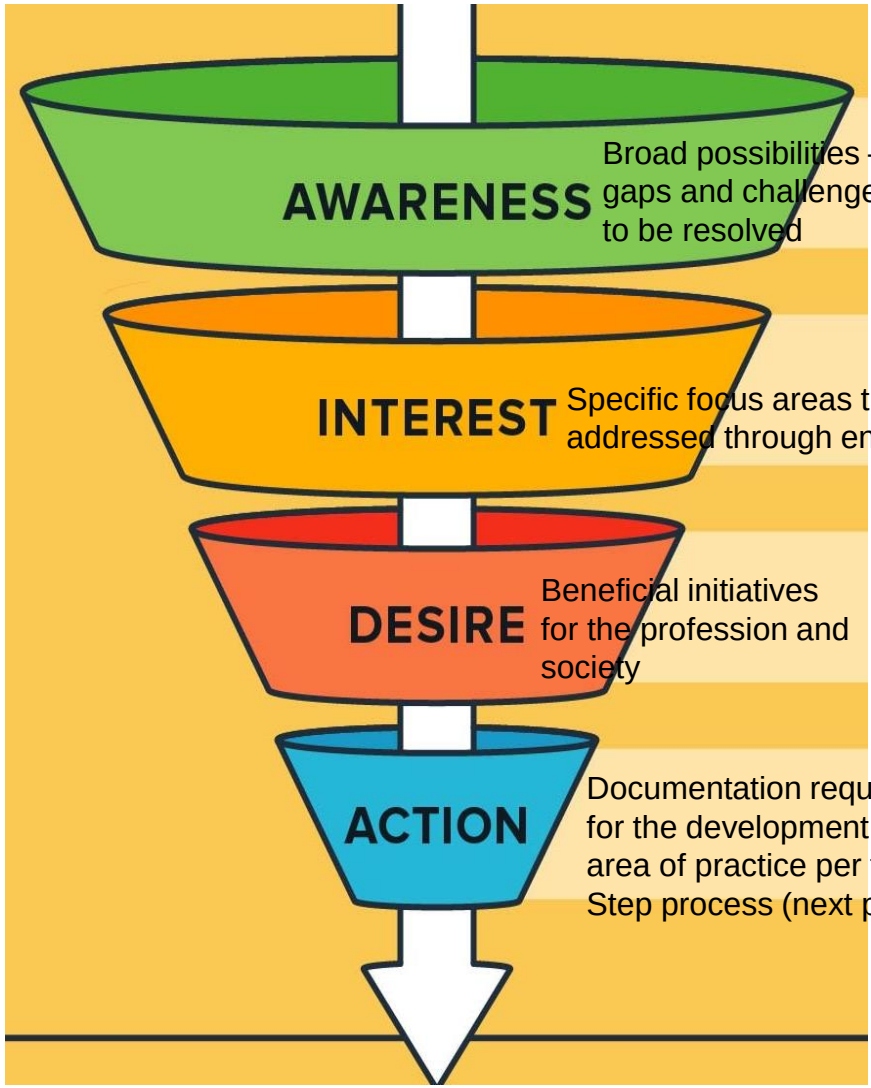




Engineering Definition:
(American Engineers Council)

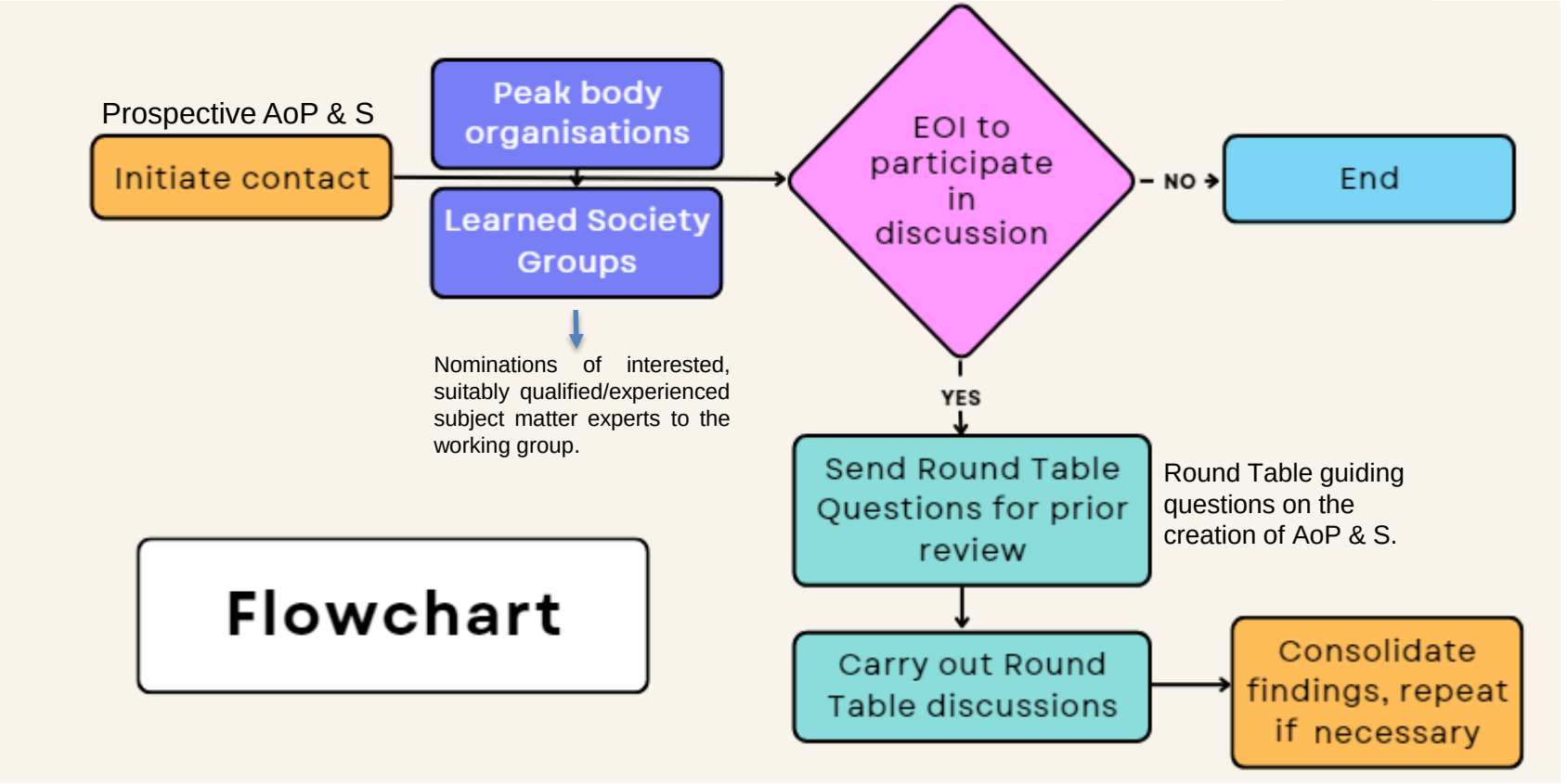
The creative **application of scientific principles** and mathematics to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behavior under specific operating conditions; all **with respect to an intended function, economics of operation, and safety for life and property.**

The Funnel Approach



Proposed steps for consultation and development of prospective AoPs

1. Liaison with **peak body organisations** for collaboration for **broad and inclusive consultation for a sustainable framework**
2. Consultation with **EA's Learned Society Groups Chair** to invite nominations to / participation in the Round Table Discussions
3. Gather **nominated/recommended industry subject matter experts** for participation in Round Table Discussions
4. Send Round Table Questions to participants for prior review
5. Schedule the groupings for the **Round Table discussions**
6. Carry out the Round Table Discussions
7. **Consolidate the findings** (repeat steps, if necessary)
8. Invite **suitably qualified members** to join **Committee** for AoP for ongoing support
9. **Populate** the **Template** for Creation of AoP based on findings
10. Finalise the **Committee Terms of Reference, ToR**
11. Submit **documentation** for **review and approval**



Overview of the Creation of AoP process

Step 1 – Business Case for representation (Questions 1~4)

Step 2 – Development of the Competency Framework (Questions 5~11)

Step 3 – Final Consultation and Approval (Questions 12~13)

Round Table Discussion: Guiding Questions

The following may assist to provide clarity on matters relevant to the engineering profession:

1. What are the **needs, issues and challenges** for the Dam Engineering in Australia? Insights from **multiple perspectives** is encouraged for a **holistic understanding**.

2. How can **EA address them** to serve the community and country? Would an EA **Area of Practice (AoP) or Specialisations** be needed to address the gaps?

3. Is there a **Business Case** for its representation as an AoP? Estimate of the number of engineering professionals that may be interested.

4. What **Value Propositions** should the AoP or Specialisation deliver for its key stakeholders, namely:
   (a) **Members** eg. Recognition of expertise, support for career progression
   (b) **Industry** eg. Addressing skills gap, Policy advocacy
   (c) **Profession** eg. Raising of the standard of project and services delivery

5. For the AoP or Specialisation, what would be the appropriate:
   (a) **Scope**
   (b) **Competency Framework** and **Career Development Roadmap** for the engineering professional

   (There are **3 categories of engineering professional**: Professional Engineer, Engineering Technologist and Engineering Associate)
   https://www.engineersaustralia.org.au/about-engineering/occupational-categories

   Are there existing global frameworks that can be adopted and adapted?

6. What does a Dam Engineering **professional do**? How do we define them?

(continue)

7. What **skills, training, qualification or certification** underpins the work of such an engineering professional?

8. What **set of competencies** do they need to have **to demonstrate competence in the typical job roles and responsibilities**? What are the relevant **Industry and Regulatory standards** to be met?

9. What are the **qualifying criteria for competency assessment**?

10. How do these **competencies change as they progress in their career**, for example from entry to mid management to senior levels?

11. How can the engineering professionals be **continually supported in their career progression**? eg. with Continuing Professional Development (CPD), Micro Credentials etc, and **who can provide them**?

12. How can the **value propositions be delivered** to the stakeholders **on an ongoing basis**?

13. **Internal readiness check** (panelists for assessment process).

Overview of the Specialisation creation process

Step 1 (Purpose of the Specialisation: Business Case)

- Recognition of engineering expertise, home to engineering professionals
- Lead the engineering profession in the practice of this S
- Avenue and platform to deliver on the value propositions to address the problems & challenges in practice
- Registration of professional practice

Step 2 (Competent Practice: Competency Framework)

- Competencies to inform competent, independent practice
- The **competency framework** (a means to an end) broadly describes the necessary underpinnings for **performance excellence** (the end we are after). The competency framework consists of the list of main competencies that equip & inform competent practice of the engineering professional in the S.
- Maintenance of the S (CPD, etc)

Step 3 (Internal readiness check, ongoing advocacy for the S)

- Committee formation for the ongoing advocacy of the S
- Internal readiness (assessors, IT systems etc) check, panellists for assessment
- Periodical review of the evolving needs of the profession
- Liaison with all stakeholders (industry, academia, regulators)

Creation of new Specialisations: 5W1H illustration

1. Business Case for it (The **Why**)
2. Competency framework for assessment of the Specialisation (*) (The **How**)
3. Identification of Assessing Entity(ies), other than EA (if any) (The **Who**)
4. Recognition of avenue(s) for registration, if applicable (Qld, NSW, others)
5. Continuous Professional Development (CPD) activities for maintenance, if necessary

When (ASAP)
Where (National, with Global mobility)
What (Dam Engineering)

*

Existing global/national frameworks could be adopted/adapted for this purpose.

Remarks

- Microcredentials (short certification courses in a specific area of industry-relevant study, consisting of theory & practice components) can be tailored to aid in item 2, if need be.
- NER Re-Imagined project as a publicly searchable register for Specialisations in the works

Thank You