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Trends in Drying Research and Technology- Open Forum

• Already outlined in Plenary Lecture- also in Proceedings

• Focus on Math Modeling of dryers – necessarily equipment and product-specific

• Relatively little basic research- theoretical and experimental- on “drying”

• Academics follow “closed loop” approach
Trends...

- Long service life of dryers encourages status quo
- Concept of life cycle cost for dryer selection is still not pervasive in industry
- No paradigm shift; slow ingestion of ideas by vendors/users
- Tendency to stick to “proven” technology deters industrial acceptance of radically new technologies
- RESULT? Little innovation and no really “destructive” drying technologies on the horizon now
- EXAMPLE? Superheated steam drying of paper- in principle, very attractive- yet, no takers so far!

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Trends...

• Complexity of new technology may deter acceptance despite major potential gains e.g. Condebelt process for linerboard or Impulse Drying of paper

• Long gestation period- 20 years for Condebelt- typically too long to sustain industry interest and funding of R&D!

• Superheated steam drying first proposed over 100 years ago! Innovation must be “timely”-not too far ahead of its time!
Current trend in drying research: Closed Loop Academic research/publication (CLA)

Little potential for successful/ cost-effective technology transfer to industry

Desired trend: Interactive Industry- Academia Interaction (IAI)

R&D problem arises from industrial experience, developed into a generic problem for basic research at university – generic part publishable while specific problem/solution may remain proprietary

Applied research without industry support is not sustainable activity over the long haul
A Suggestion......

• Industry proposes viable, fundable R&D ideas on web
• Academics have ideas on how the problem may be tackled and submit proposals for evaluation
• If mutually agreeable, industry funds the project with a basic and an applied component - the former publishable in open domain
• Note difference from consulting activity, which makes no contribution to domain knowledge
Potential hick-ups?

- Objectives and time scales of industrial R&D are widely different from those of academic research.
- One is profit driven - the other is non-profit organization.
- Industry typically wants results “yesterday”; academics happy of results trickle out “tomorrow”!
- Some adjustments are essential for mutual benefit - combine short term and long term objectives; not easy but doable!
Closing remarks...

- See editorials in DRT on R&D, Innovation, University-Academia interaction
- Cooperative R&D will be cost-effective as industry is reducing R&D contribution to total basic knowledge base in USA—elsewhere situation may be worse
- Europe is showing signs of rising university-industry collaboration with industry funding
- Developing countries are also making contribution mainly in applied areas relevant to regional development

- THANK YOU FOR YOUR ATTENTION