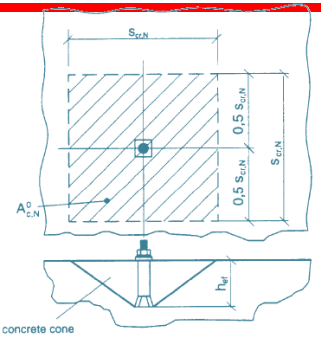
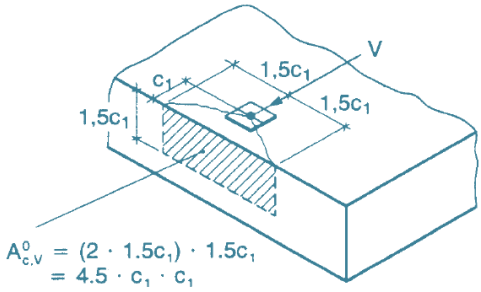
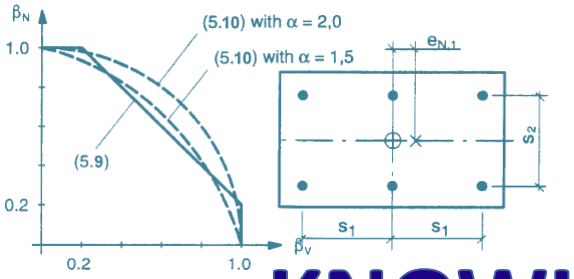
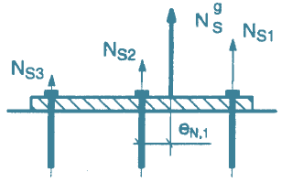




$$A^0_{c,V} = (2 \cdot 1.5c_1) \cdot 1.5c_1 = 4.5 \cdot c_1 \cdot c_1$$





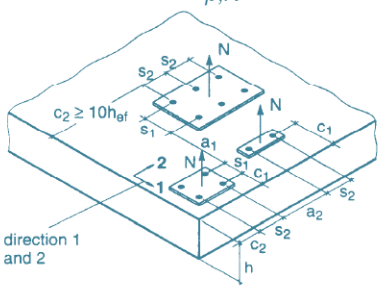
$$N^g_s = \sum N_{Si}$$

$$N_{S1} = N^h_s$$

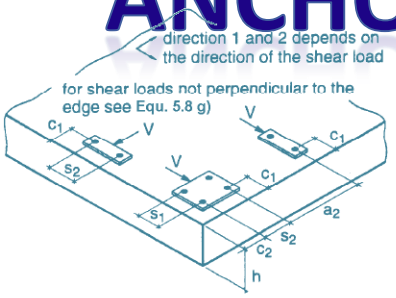
$$s_{cr,Np} = 20 \cdot d \cdot \left(\frac{\tau_{Rk,ucr}}{7.5}\right)^{0.5} \leq 3 \cdot h_{ef}$$

KNOWLEDGE PARTNER FOR YOUR ANCHORING NEEDS

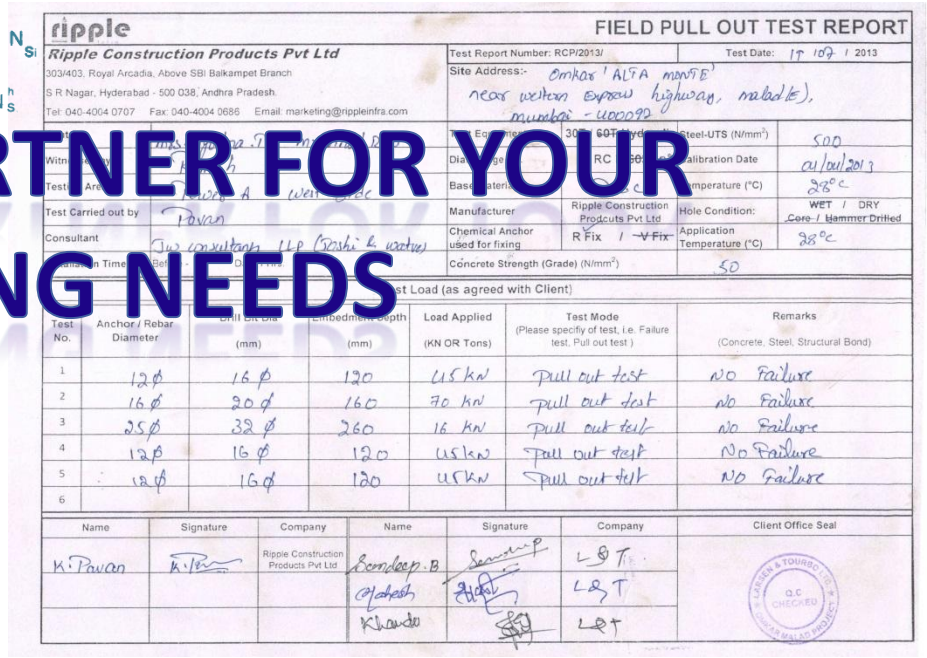
$$N_{Rk,p} = N^0_{Rk,p} \cdot \frac{A_{p,N}}{A^0_{p,N}} \cdot \psi_{s,Np} \cdot \psi_{g,Np} \cdot \psi_{ec,Np} \cdot \psi_{re,Np}$$



a) anchors subjected to tension load



b) anchors subjected to shear load in case of anchorage near to an edge



ripple

FIELD PULL OUT TEST REPORT

Ripple Construction Products Pvt Ltd
303/403, Royal Arcadia, Above SBI Balkampet Branch
S R Nagar, Hyderabad - 500 038, Andhra Pradesh.
Tel: 040-4004 0707 Fax: 040-4004 0686 Email: marketing@rippleinfra.com

Test Report Number: RCP/2013/ Test Date: 17 / 07 / 2013
Site Address:- Omkar 'ALTA monte' near western Express highway, malad(E), mumbai - 400097
Steel-UTS (N/mm²): 500
Calibration Date: 01/Jul/2013
Temperature (°C): 28°c
Test Carried out by: Pavan
Manufacturer: Ripple Construction Prodcuts Pvt Ltd
Hole Condition: WET / DRY — Core / Hammer Drilled
Consultant: Jw consultants LLP (Joshi & watve)
Chemical Anchor used for fixing: R Fix / V Fix
Application Temperature (°C): 28°c
Concrete Strength (Grade) (N/mm²): 50

Test Load (as agreed with Client)

Test No.	Anchor / Rebar Diameter	Drill Bit Dia (mm)	Embedment Depth (mm)	Load Applied (KN OR Tons)	Test Mode (Please specify of test, i.e. Failure test, Pull out test)	Remarks (Concrete, Steel, Structural Bond)
1	12ϕ	16ϕ	120	45 kN	Pull out test	NO Failure
2	16ϕ	20ϕ	160	70 kN	Pull out test	No Failure
3	25ϕ	32ϕ	260	16 kN	Pull out test	No Failure
4	12ϕ	16ϕ	120	45kN	Pull out test	No Failure
5	12ϕ	16ϕ	120	45kN	Pull out test	NO Failure
6						

Name	Signature	Company	Name	Signature	Company	Client Office Seal
K. Pavan	K. Pavan	Ripple Construction Products Pvt Ltd	Sandeep. B	Sandeep	L&T	
			Mahesh	Mahesh	L&T	
			Khande	Khande	L&T	

Anchor and its Classifications

An Anchor is a device which safely transfers the subjected load onto the base material on which it is fixed.

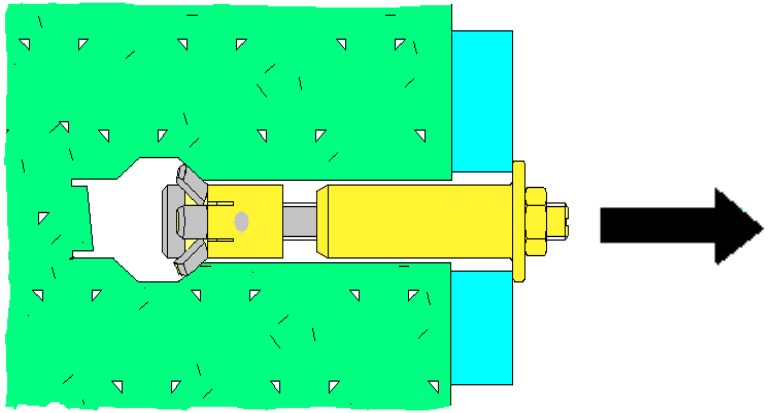
Based on Material

- Chemical
- Metal (Mechanical)
- Polyamide/Nylon

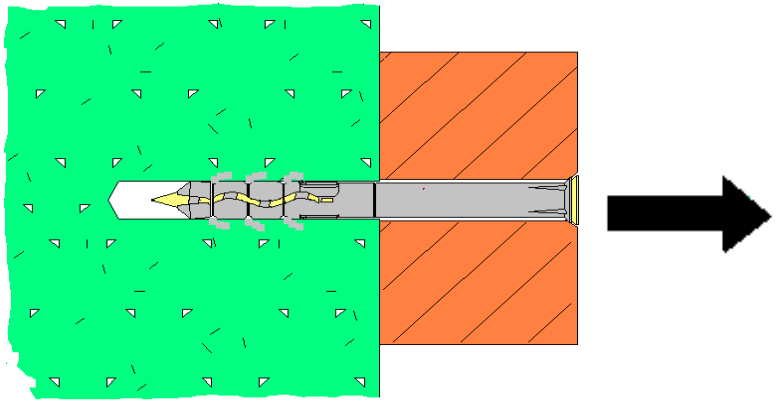
Based on Criticality of Fixing

- Heavy Duty
- Medium Duty
- Light Duty

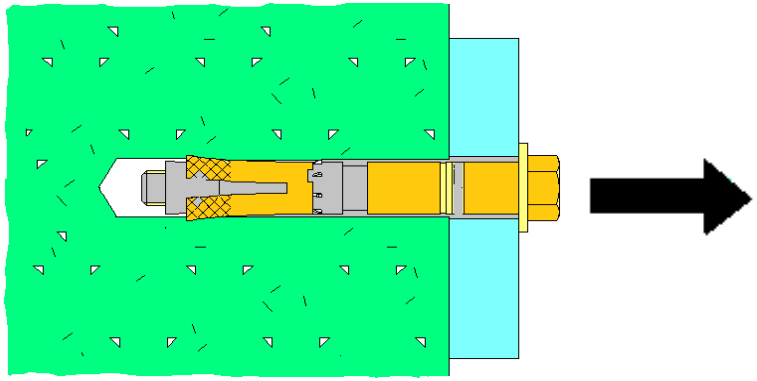
Anchor Principles



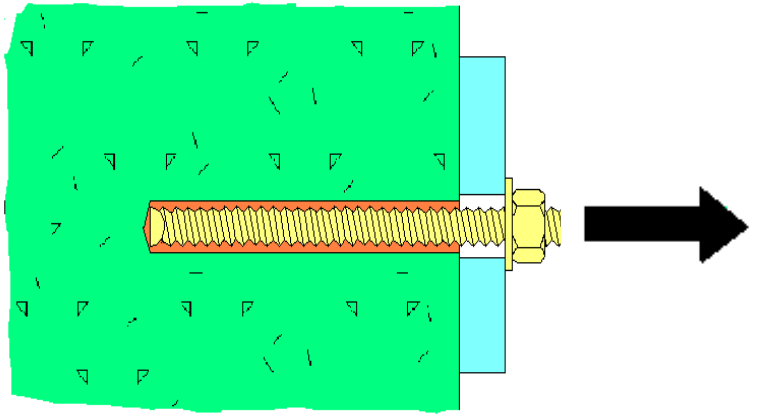
Keying



Friction

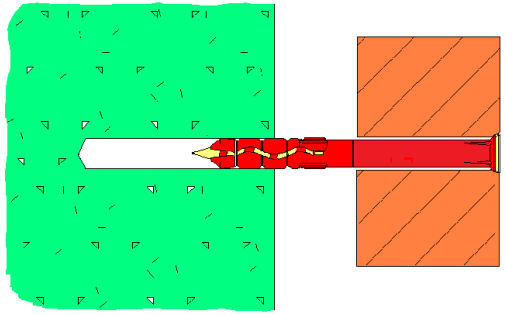


Combined Keying & Friction

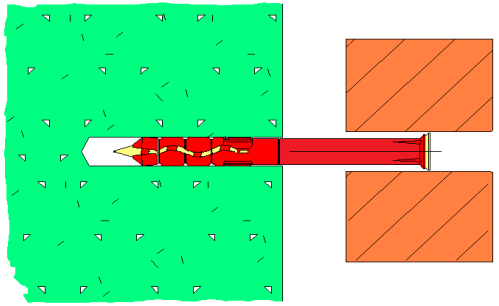


Adhesion

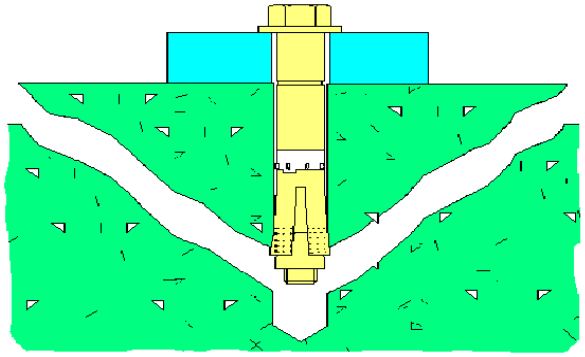
Anchor Failure Modes



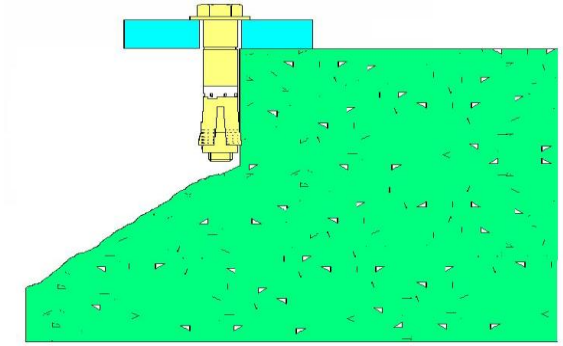
Pull - Out



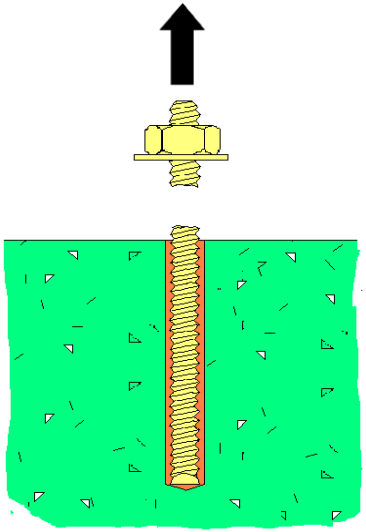
Pull - Over



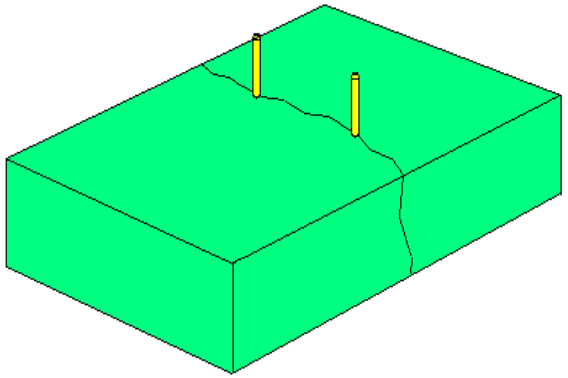
Concrete Cone Failure



Concrete Edge Failure



Steel Breakage



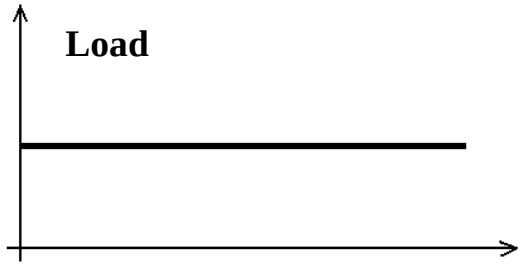
Splitting of Base Material

Anchor Influencing Factors

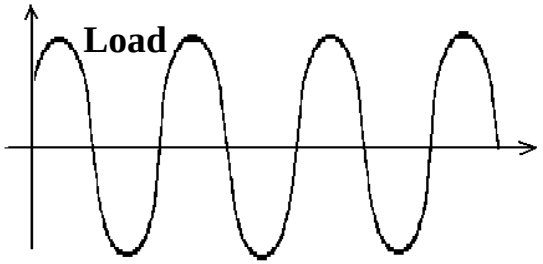
- Load Direction
- Nature of Load
- Base Material
- Anchor Spacing & Edge Distance
- Embedment Depth
- Tightening Torque
- Reinforcement
- Fire and Temperature
- Corrosion

Anchor Influencing Factors

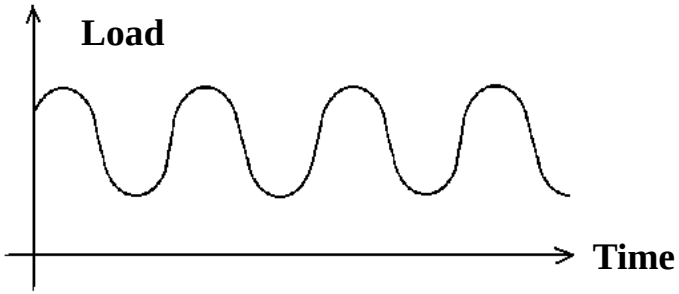
Nature of Load



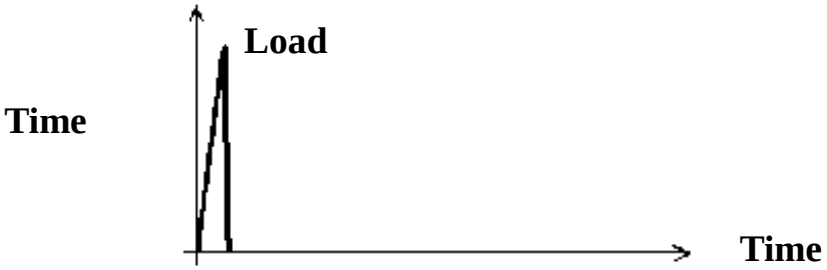
Static Load



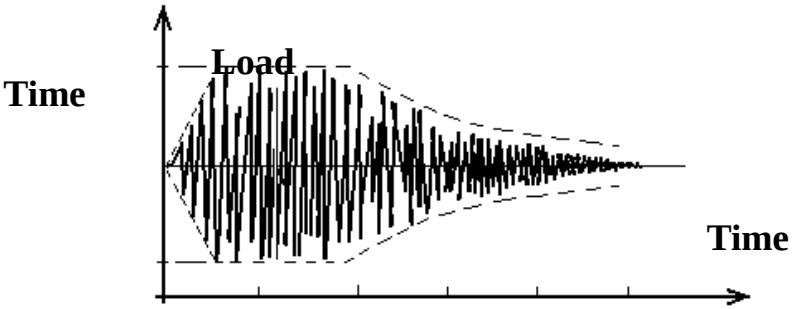
Alternating Load



Pulsating Load



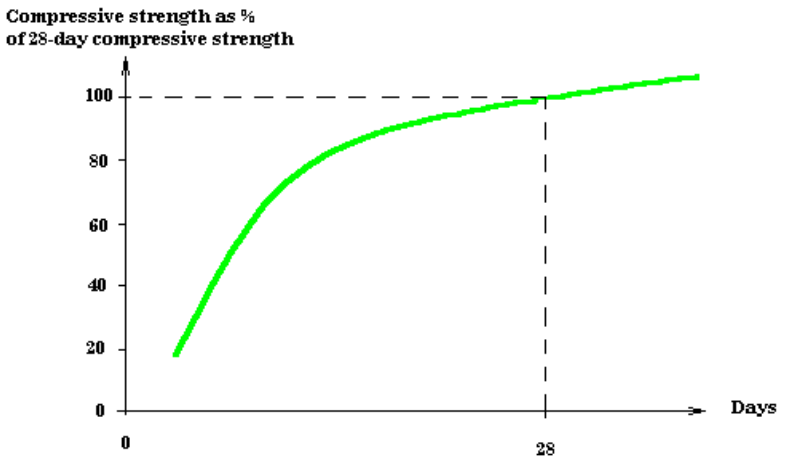
Shock Load



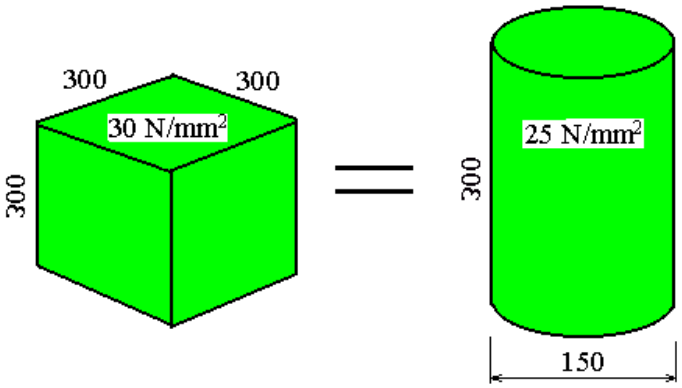
Seismic Load

Anchor Influencing Factors

Base Material



Development of concrete compressive strength



Concrete test samples

fc = Cylinder compressive strength.

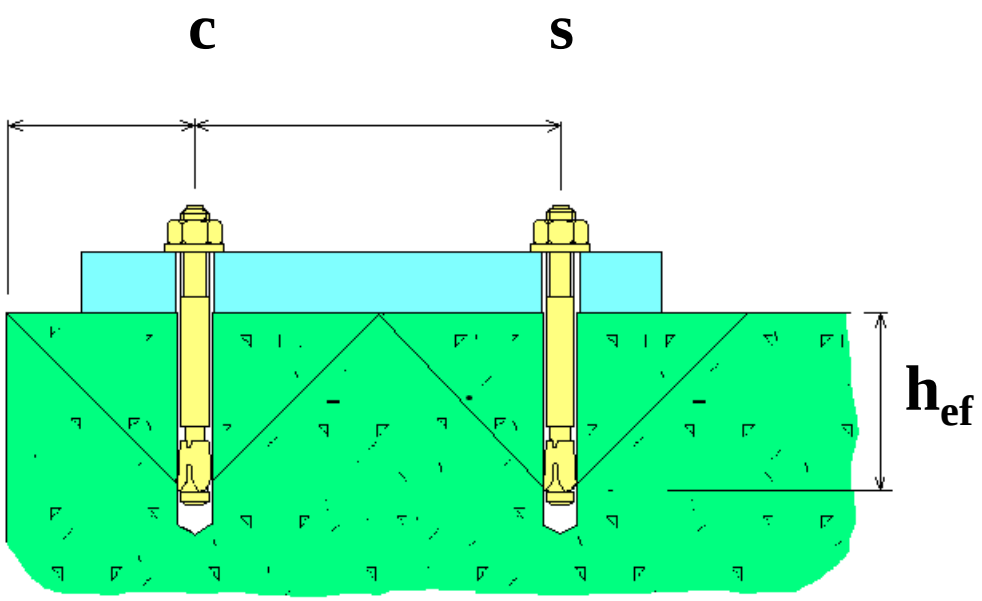
fcc = Cube compressive strength.

New designation from Eurocodes :

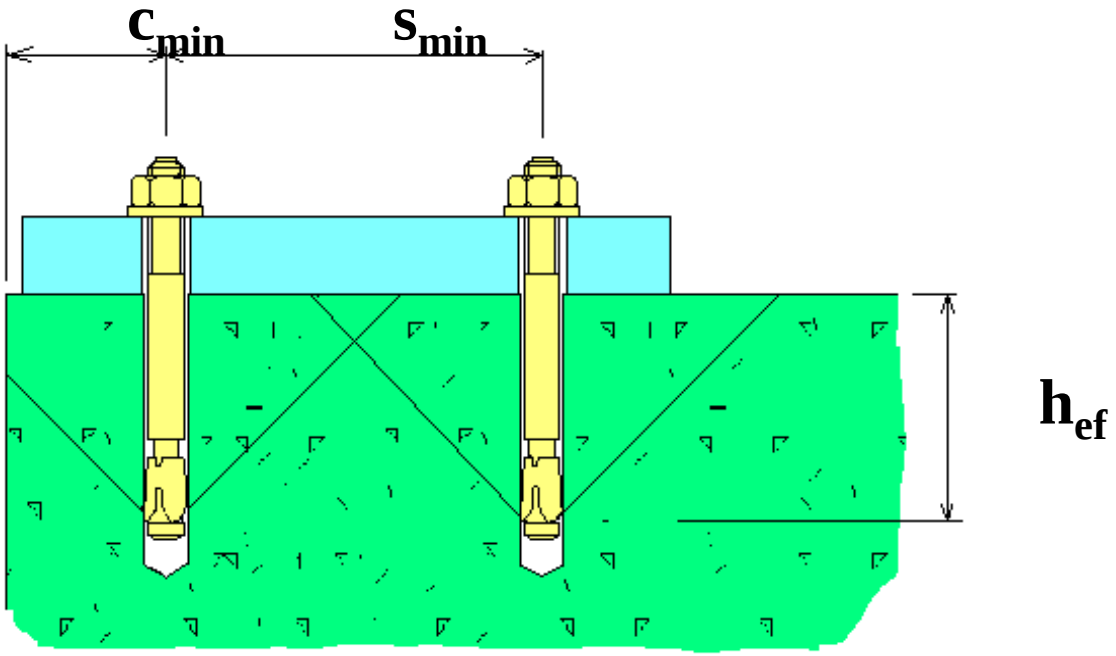
Class Cylinder/Cube strength e.g. C25/30

Anchor Influencing Factors

Anchor Spacing & Edge Distance

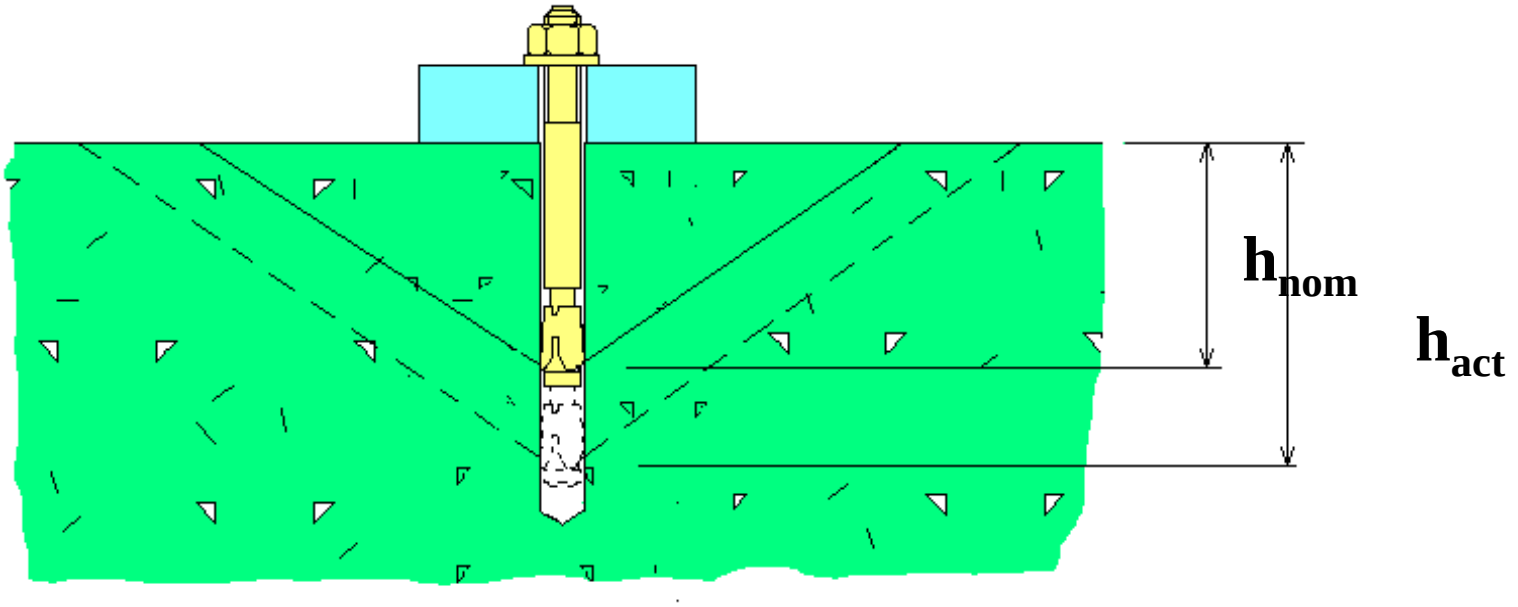


Anchor Spacing & Edge Distance

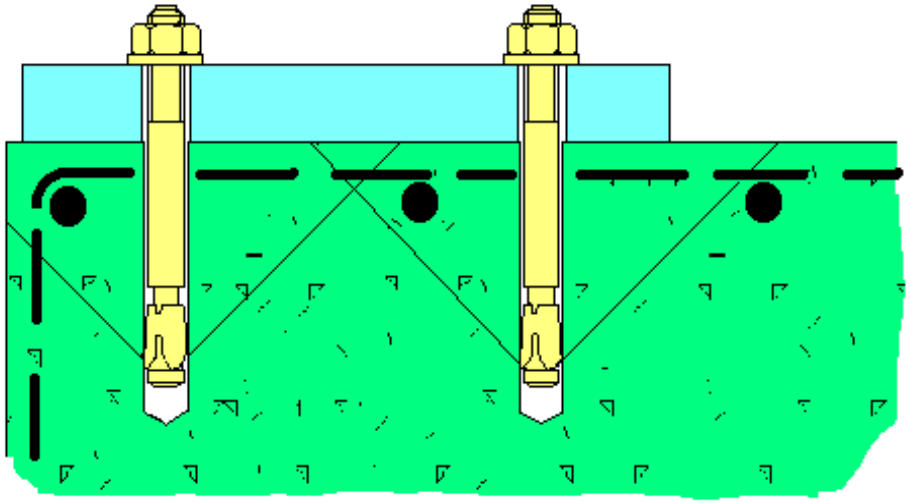


Anchor Influencing Factors

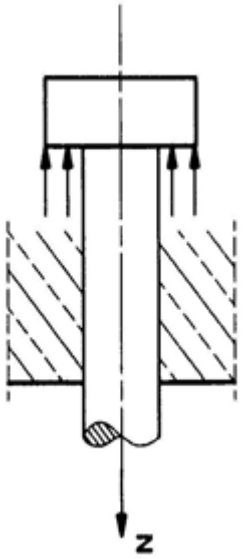
Influence of Embedment Depth



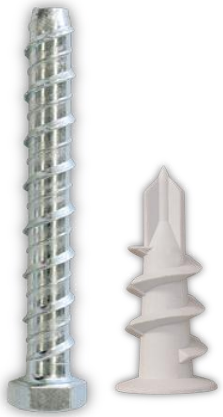
Effect of Reinforcement

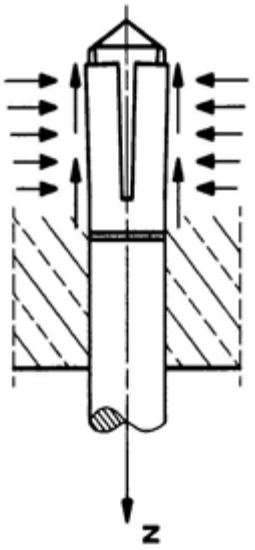


WORKING PRINCIPLES OF ANCHORS

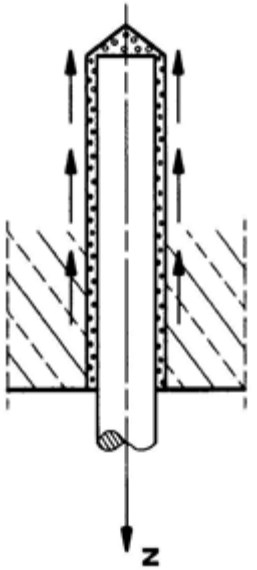


Mechanical Keying





Friction



Bond

OUR FLAGSHIP PRODUCTS

RIPPLE R-Fix Pure Epoxy Resin based Chemical anchoring system

- Suitable for dynamic loads, Higher embedment depths.
- Hammer drilled and diamond drilled holes possible.
- Overhead application; water filled bore holes.
- Suitable for attachment point close to the edge anchoring is free of expansion forces.
- High chemical resistance, low odour.
- High bending- and pressure strength.
- Cartridge can be reused up to the end of the shelf life by replacing the static mixer or resealing cartridge with the sealing cap.

ETA option 1

ICC ES ICC-ES ESR-2583 CRACKED & UNCRACKED CONCRETE

iBMB

SEISMIC REGION QUALIFICATION

NSF

Feuerwider-standsklasse F 120

OUR FLAGSHIP PRODUCTS

RIPPLE V-Fix Vinyl Ester Resin based Chemical anchoring system

- For anchoring - doweling and post-installed rebar connection.
- Fire resistance test report: 3290/0966
- Overhead application; water filled bore holes.
- Suitable for attachment points with small edge and axial distances due to an anchoring free of expansion forces.
- High chemical resistance, Low odour
- high bending- and pressure strength.
- Cartridge can be reused up to the end of the shelf life by replacing the static mixer or resealing cartridge with the sealing cap.

ETA option 1

ICC ES ICC-ES ESR-2583 CRACKED & UNCRACKED CONCRETE

iBMB

CE

NSF

Feuerwider-standsklasse F 120

Heavy duty Chemical Anchoring System for cracked concrete

V Fix is a Vinyl Ester based chemical designed specifically for the Construction Industry for anchoring of threaded rods, reinforcing bars into concrete (porous & light) as well as solid masonry**.**

- A fast, secure and **expansion pressure-free anchoring** of the most diverse elements (threaded rods, reinforcing iron, steel profiles, etc) to the most diverse substrates (concrete, rock, stone, masonry, wood etc.)

- Replaces traditional metal anchors and makes new applications possible, especially as a result of an anchoring to **narrow center distances** which are extremely **close to the edge** being possible.

Heavy duty Chemical Anchoring System for cracked concrete

Mechanical properties acc. to EN 196 Part1

- Density: 1.65 g/cm^3
- Compressive strength: 80 N/mm^2
- Bending strength: 17 N/mm^2
- Dynamic modulus of elasticity: 4000 N/mm^2

Approvals: **V Fix Ripple Construction Products Pvt Ltd**

- ETA accd. to TR 029 in concrete & Seismic design
- Drinking water application accd. to NSF Standard 61
- Fire Testing by 3290/0966
- Civil Aid (Bureau Veritas) India Tested MT:AG/1924(b)

410 ml

CE Certified option1

Can be used in Cracked and Un-Cracked concrete

Hard Plastic Body

Protects from transportation damages & material handling

Air Tight Cap

Stop-n-go Applications for repeated usage

V Fix™

Key Features	Advantages
1. Heavy Duty Chemical Anchoring System	1. High dynamic loads & safe Chemical anchoring
2. ETA Option 1 Certification	2. Reliable fixing in cracked & un-cracked concrete
3. F120 Fire Resistance Certification	3. Fire Resistant up to 240 minutes
4. Vinyl Ester based chemical	4. High Bonding, low shrinkage, & high Chemical resistance
5. Suitability of applications with various Base Materials	5. Excellent compatibility with wide range of Base Material
6. Styrene free Chemical anchoring system	6. Low odour – can be used in confined area, Ozone friendly
7. Fast Curing formula at elevated temperatures	7. Normal embedment depths, Higher ambient temperatures.

Some Typical Applications

- Rebar Fixings
- Heavy Duty Fixings
- Steel & wooden structural Beams & columns
- Cantilevers, Pipe supports
- Pumps, Machines
- Guard rails, Gates
- Heavy duty ladders
- Mechanical Equipment
- Wet holes

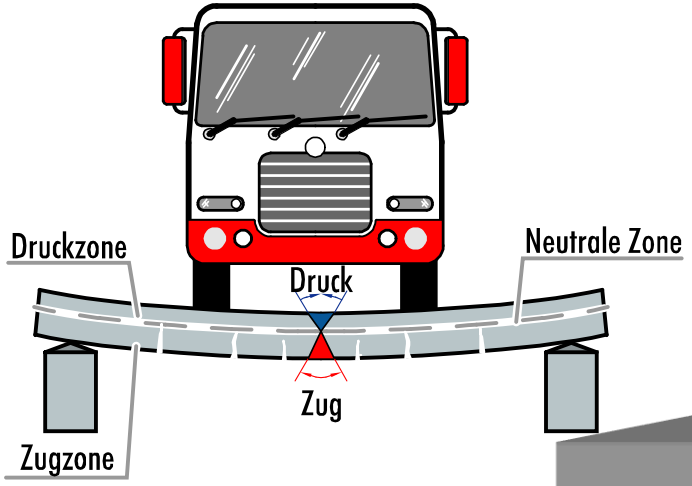
Suitable base materials

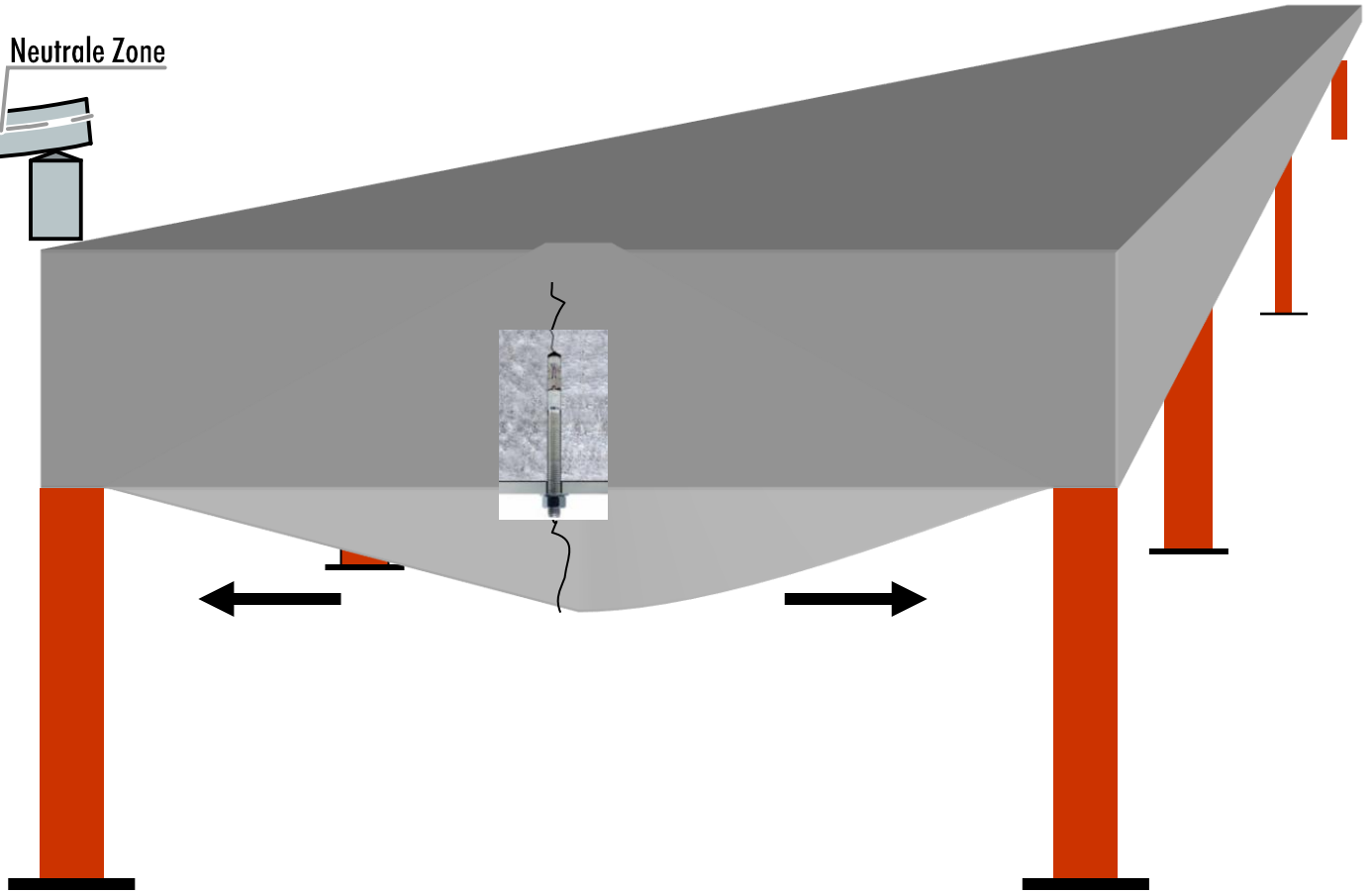
- Concrete
- Solid brick
- Honeycomb brick
- Cell like clay brick
- Light weight honeycomb brick
- Dense aggregate block
- Hollow light aggregate block
- Aerated concrete
- Solid stone

Temperature Range

- ❑ **Base material temperature range from +5°C up to +40°C at the time of application.**
- ❑ **Cartridge storage temperature min. +5°C; optimal +20°C and under 25°C. Do not expose the cartridges to Sun Light and heat**
- ❑ **Cured mortar can withstand the temperatures of base material ranging from -40°C to +72°C**

BEHAVIOUR OF CONCRETE





FAILURES DUE TO BAD ANCHORING

Ceiling Collapse

Product without proven data

Ceiling Collapse in Tunnel

Wrong Selection

HVAC Duct Collapse

Ad hoc methods

Column Failure

Edge distance not considered

Ceiling Collapse

SS304 over SS316

Bond Failure

Wrong Installation

Accessories Program

V Fix in 385 & 585 ml sizes

V Fix Mixing Nozzle

V Fix Extension tube

V Fix Dispensing Gun

Manual Blow Pump

Applications

JACKETING

Anchor Testing

We also conduct random PULL OUT tests based on our customer's requests at their jobsite for R Fix installations

We issue the Pull Out Test certificate on the tests conducted at our Customer's jobsite for their records

Service

Stock : Ex-Stock Central Ware House Hyderabad

Ready Stocks at our Branch Offices – Mumbai, Bangalore, Kolkata, Delhi, Chennai, Bhubaneswar.

*** Soon we are going to have our retail partners at Jamshedpur, Cochin, Ahmedabad, Rourkela, Raipur.

Sales Engineers: Available at most major Cities in India

Services including :

Visiting the Jobsite, Understand the needs, recommend, Submit proposals, Brochures, Catalogues, meet consultants to seek their approvals, demonstrations at site, seminars, presentations, design support, On-site training to the application team, Delivery of the Products etc.,

The buzz is to PARTNERING for PERFORMANCE which enhances the productivity and the overall business growth.

Our Services are focused on achieving Consistent & Sustainable business results from all beneficiaries in long term.


Thank You!